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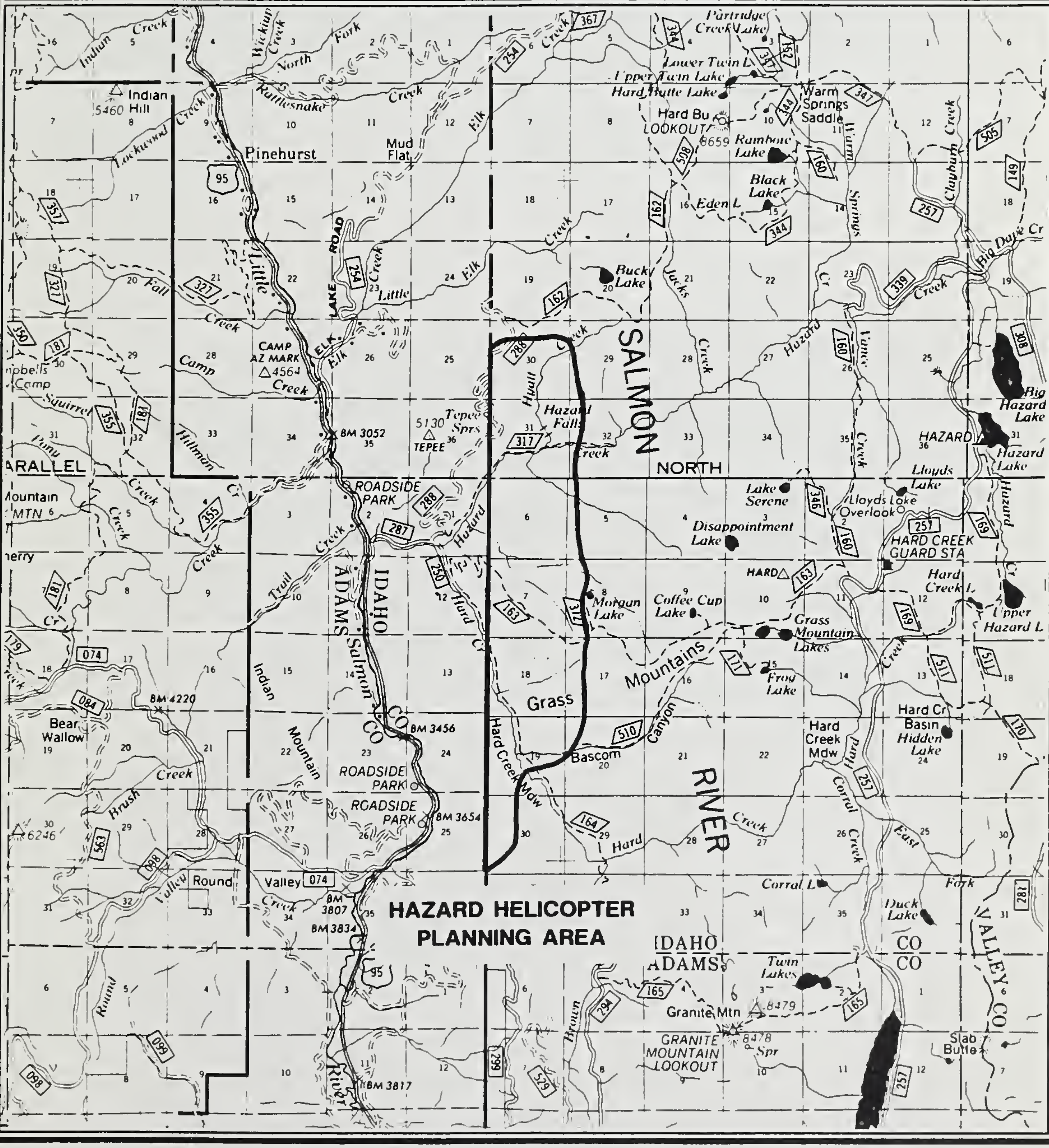
Agriculture

Hazard Helicopter Timber Sale

DRAFT ENVIRONMENTAL IMPACT STATEMENT



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Purpose and Need

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Chapter 1
Purpose and Need

THE PROPOSED ACTIONS — THEIR PURPOSE AND NEED

The Payette National Forest proposes to reconstruct roads and harvest timber in the Hazard Helicopter timber sale. The proposed sale planning area lies within and adjacent to the French Creek/Patrick Butte Roadless Area. This sale follows the direction in the Payette National Forest Land and Resource Management Plan (Forest Plan 1988), which guides management of the entire Forest in a prudent and comprehensive way.

Because no single acre on the Forest can serve all uses at once, the Forest Plan allocates different emphases to different areas of the Forest, based on the land's capabilities. The Forest is divided into 26 management areas. The Hazard Helicopter planning area lies in Management Areas 10 and 11. Management Area 10 provides for primarily unroaded, multiple-use management, including some extensive timber management. Management Area 11 provides for roaded, multiple-use management, including intensive timber management.

The Hazard Helicopter timber sale is listed in the Timber Sale Activity Schedule (Appendix A to the Forest Plan, as updated in 1993). The proposed action is based on this schedule and is represented in this EIS (environmental impact statement).

The proposed action would:

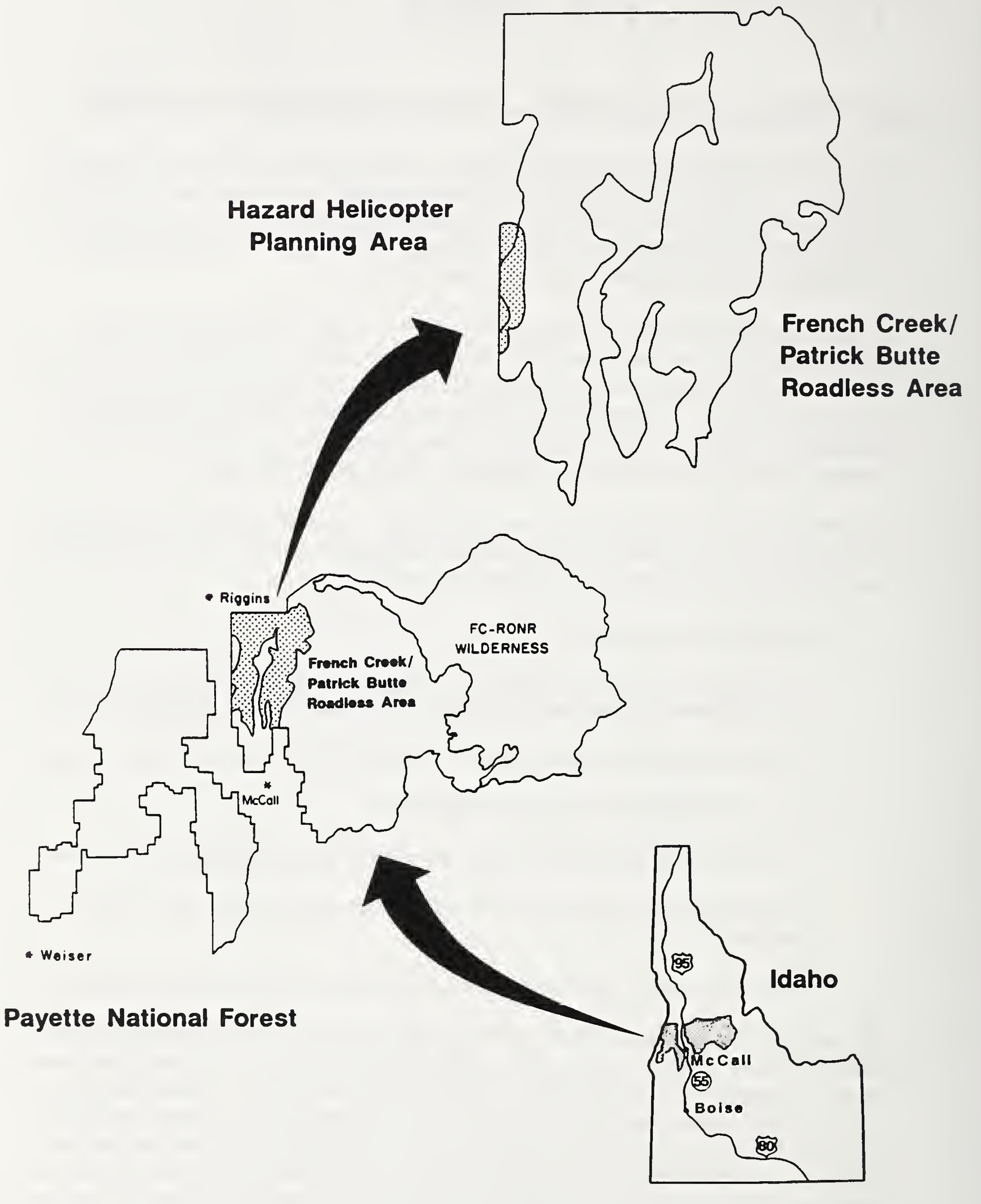
- Improve the long-term health and timber productivity by removing some high-risk overstory trees and releasing mixed stands of ponderosa pine, Douglas-fir, and western larch; and
- Provide wood products for the nation and opportunities for timber-related jobs and income.

The proposed action would accomplish this by:

- Harvesting 7.0 MMBF (million board feet) of timber in the Hazard Helicopter planning area.
- Following Forest Plan standards and guidelines, which serve to protect the many Forest resources.
- Taking advantage of opportunities to improve the conditions of all the Forest's resources.

The *proposed action* and the *preferred alternative* are not the same. The *proposed action* is the initial project or activity that the Forest Service intends to analyze under the requirements of NEPA (National Environmental Policy Act). The purpose and need for this action arises when the existing condition of an area does not meet the desired future condition specified in the Forest Plan. The *proposed action* generates issues through public scoping and internal review. The ID (interdisciplinary) Team develops a reasonable range of alternatives based on these issues and then conducts an environmental analysis of the potential effects of the alternatives. From this analysis, the Responsible Official chooses a *preferred alternative*. This

Figure 1.1. Vicinity Map for the Hazard Helicopter Planning Area



choice is based on how well each alternative responds to the issues, complies with environmental laws and regulations, approaches the desired future condition for the area as described in the Forest Plan, and meets the purpose and need of the original *proposed action.*

THE PLANNING AREA

The proposed Hazard Helicopter timber sale planning area covers 4,141 acres within the Hazard and Hard Creek tributaries to the Little Salmon River drainage on the New Meadows Ranger District of the Payette National Forest. Access to the area is from the west, using existing roads. The planning area lies entirely in Idaho County, Idaho. More specifically, the planning area is located about 15 miles north of New Meadows, and a mile east of Highway 95 (Figure 1-1, Vicinity Map).

The planning area is the broad planning outline of the proposed sale and not the actual acres proposed for harvest.

THE FOREST PLAN

The proposed actions conform to the Forest Plan. The Forest Plan directs and integrates management of the entire Forest, including roadless areas.

Specific Forest Plan Direction - The Forest Plan's Final EIS analyzed a range of development and non-development alternatives for all of the Forest's roadless areas. Based on that analysis, the Forest Plan recommends some roadless areas for wilderness and assigns others to non-wilderness management.

The Forest Plan assigns part of the French Creek/Patrick Butte Roadless Area to timber management. Most of the Hazard Helicopter planning area is in the roadless area.

Appeals to the Forest Plan - The Forest Plan is currently under appeal. Taking that into account, the Forest Supervisor has decided to proceed with the analysis for the proposed action, while efforts to resolve the appeals continue.

Outyear Timber Sales in this Roadless Area - The Forest Plan's Timber Sale Activity Schedule proposes 9 other timber sales in the French Creek/Patrick Butte Roadless Area in the next 10 years:

Fourmile (1994)
Freight Landing (1994)
French Creek (1994)
Jenkins (1994)
Lower Elkhorn (1995)
Elkhorn Lodgepole (1998)
Lake Creek Helicopter (1998)
Partridge Helicopter (1998)
Beulah Butte (1999)

Site-specific information for the last four sales is not available at this time. What information

is available is included in the analysis to determine the potential contributions to cumulative effects. **None of these sales are part of this proposed action.**

FUNCTION OF THIS EIS

This EIS analyzes and describes the potential, site-specific environmental effects of the timber sale on resource-oriented affected areas. This analysis is tiered to and supplements the analysis in the broader EIS prepared for the Forest Plan.

This two-step analysis approach is consistent with the court decision regarding California v. Block (1982) and the decision made by the Chief of the Forest Service concerning the Idaho Panhandle National Forest Plan appeals (August 15, 1988). The Chief stated that Forest Plan decisions regarding allocations of roadless areas to non-wilderness uses are not irreversible or irretrievable. Forest Plan decisions *allow* development, rather than *mandate* it. The site-specific effects must be examined before development can occur.

Within that context, the Payette National Forest convened an ID Team of resource specialists in 1989. The Team evaluated the desired future condition in the proposed planning area, developed alternatives to implement the proposed action, estimated environmental effects, and compared the alternatives. This EIS documents the Team's results.

DESIRED FUTURE CONDITION

The current condition in the planning area is described in Chapter 3. The *desired future condition* describes what the planning area should be like in about 50 years. It represents the Forest Plan's Forestwide standards and guidelines, goals, and objectives applied at the site-specific project level. This EIS discusses a range of management alternatives that move the planning areas toward their *desired future condition.*

The *desired future condition* for the Hazard Helicopter planning area in Management Area 10 is described in the following paragraphs.

- Management emphasis is on preserving visual quality and naturalness while supplying a minor amount of timber. The planning area is managed for backcountry recreation opportunities. The land appears substantially natural, with old-growth stands abundant.

- About once every 20 years, a timber sale is logged by helicopter. After two or three entries, about 10 million board feet of timber have been harvested and utilized by local industry. Harvest openings are widely dispersed, and natural regeneration is dense in some areas and scattered in others. Some partially cut stands and logging slash may be apparent to the careful observer.

- No new roads have been constructed . Access remains to existing roads, and to trails for hikers and horseback riders, and trail vehicles. Trails are maintained in passable condition, and receive moderate use by day hikers, hunters, and backpackers.

- Recreationists enjoy a feeling of solitude and primitive recreation. Summer hikers share the trails with mountain bikes. In the fall, some hunters enjoy quality elk-hunting experiences on foot, horseback, or trail vehicles.

- Elk numbers are stable at herd target levels. Sufficient large, dead trees remain to support woodpeckers and other snag-using species. Old-growth dependent wildlife are sometimes seen, and their populations are stable.

- Livestock trail through the area in the summer. Forest insects and diseases fluctuate from low to high levels depending on stand vigor, weather, and natural fires.

- Soils retain greater than 90 percent of their natural productivity. Riparian areas are in very good condition, and continue to provide clean water for trout, salmon, and steelhead downstream.

The *desired future condition* for the Hazard Helicopter planning area in Management Areas 11 is described in the following paragraphs.

- The planning area is managed primarily for intensive timber production, as well as elk habitat, water quality, dispersed recreation, and cattle grazing.

- The timber stands contribute to a sustained yield of timber. About once a decade, the area is entered for timber management; timber is cut, trees are planted, and dense stands are thinned.

- Management of the stands has produced a mosaic across the landscape of even-aged timber stands of varied age and shape. Clearcuts are now plantations of seedlings to pole-size trees over 50 feet tall. Douglas-fir, ponderosa pine, western larch, and Engelmann spruce have been planted, while lodgepole pine, grand fir, and subalpine fir have come in naturally.

- The timber stands are thinned to increase the growth of the remaining trees. As a result, the trees are healthy and vigorous, with minor effects from insects and diseases.

- A network of old-growth habitat extends throughout the areas. Old-growth dependent animal populations are stable, if not abundant. Some large, dead trees remain and support woodpeckers and other snag-using species. Elk numbers are stable at target levels.

- Soils retain more than 90 percent of their natural productivity. Riparian areas are in good condition. Streams provide clean water for trout, steelhead, and salmon within and below the planning areas.

- Most new roads built during the past 50 years are gated or blocked and closed to most public motorized vehicles. Trail vehicles are only allowed on designated roads and trails.

- Trails are maintained in passable condition and receive light to moderate use by hunters, hikers, and mountain bicyclists. Hunters enjoy quality elk hunting experiences on foot, horseback, or trail vehicles. From higher vantage points, a number of clearcuts and several roads are visible. Hikers pass through some clearcuts and near others.

DECISIONS TO BE MADE

The Responsible Official for this EIS is the Forest Supervisor. Based on the analysis for the Final EIS, the Responsible Official will make the following decisions and document them in the Record of Decision accompanying or following the Final EIS:

Should the timber planning area be entered at this time for timber harvest and regeneration? If so, then:

- How many acres and how much timber volume should be harvested?
- Where and how should that timber be harvested?
- What measures should be taken to move all the Forest's resources toward the desired future conditions described in the Forest Plan?
- What management requirements and mitigation measures are necessary to meet Forest Plan standards and guidelines for all resources?
- What monitoring requirements are appropriate to evaluate project implementation?

ISSUES

Issues are concerns about the Forest's management. To determine the issues for this timber sale, the Forest announced their plans for Hazard Helicopter and five other timber sales in a Notice of Intent to Prepare an Environmental Impact Statement in the June 9, 1989 edition of the *Federal Register*. The notice invited the public to comment on the scope of the environmental analysis and on potential issue categories. The Forest also sent invitations for comment to people on its planning mailing list. In June of 1989, the Forest conducted meetings in Boise and McCall, Idaho, to discuss the proposed timber sales and invite comments.

Over 150 pieces of written and oral comments were received during the 30-day comment period. The Forest analyzed the comments, combined them with management concerns and public issues from previous planning efforts, and developed a list of issues. In 1992, the current ID Team assigned to analyze the proposed sales reviewed and updated the issues to reflect more recent knowledge gained from field visits and inventories, changes in Forest Service management emphasis, as well as public input on these and other Forest projects (see Chapter 5 for more on this process).

The issues that resulted are described below. A brief description of each issue is followed by indicators that help show how the alternatives respond to the issue. Where possible, these indicators are physical measures, such as acres, miles, or board feet. Each issue is discussed in detail in Chapter 3. A summary comparison of how the proposed alternatives would affect the issues may be found in Chapter 2. The Record of Decision that will accompany or follow the Final EIS will assess how well the proposed alternatives addressed these issues.

WATER

The first issue is the effects of the proposed timber sale on water quality.

Indicator: Percent over natural sedimentation

Background To Issue: Road reconstruction and timber harvest could accelerate surface erosion and increase stream sedimentation rates. Accelerated sedimentation of streams can

degrade water quality, alter channel morphology, and adversely affect beneficial uses.

The second issue is the effects of the proposed timber sale on water yield and timing of peak runoff.

Indicator: Percent of subwatershed harvested

Background To Issue: Timber harvest and road reconstruction can increase overall water yield of a watershed and can change the timing of peak runoff of streams. In addition, compaction of the ground decreases the percolation of water into the ground. This not only increases surface runoff but also delivers runoff to the stream earlier. Increases in water yield, particularly changes to peak runoff, can increase bank erosion, thereby destabilizing the dynamic equilibrium of the system. The amount of water yield increase is proportional to the percent of subwatershed harvested.

FISH HABITAT

The issue is the effects of the proposed sale on fish habitat.

Indicators:

- Percent over natural sedimentation
- Miles of road constructed or reconstructed
- Number of stream crossings constructed
- Proximity of harvest to perennial waters
- Risk of toxic spills

Background To Issue: Fish habitat consists of many components, and management activities may negatively impact some or all of the habitat requirements. Streams within the planning areas provide an important part of quality fish habitat. Threatened Snake River chinook salmon habitat is present within the drainage potentially affected by the proposed activities.

BIOLOGICAL DIVERSITY

The first issue is the effects of the proposed timber sale on old-growth habitat.

Indicator: Following harvest, the percent and distribution of forest in old-growth condition within and adjacent to the planning area

Background To Issue: Timber harvest and associated activities can reduce the acres of forest in old-growth condition to the point that ecological function is modified and ecosystem sustainability is threatened. The old growth in this sale is an integral component of the ecosystem. The issue is whether ecosystem function can be sustained with implementation of the proposed timber sale.

The second issue is the effects of the proposed timber sale on forest health at the landscape level.

Indicators:

- Following harvest, the remaining unfragmented forest blocks and their arrangement over the landscape.
- Following harvest, the representation of successional stages in the planning area within the range of presettlement conditions.

Background to Issue: Large blocks of mature/old growth forest are present across the planning area and affected drainages. Fire suppression has reduced the extent of younger successional stages. Populations of plants and animals associated with large blocks of interior forest in mature and old-growth stages are relatively high. Risk of insects, disease and fire catastrophe may be increasing.

Timber harvest and associated activities could create openings in large blocks of timber that may produce edge effects, indirectly reducing interior habitat for certain species of plants and animals, isolating populations and interfering with animal movements. Certain successional stages could be lost from the landscape. A healthy forest retains all of these features that ensure a sustainable ecosystem.

The third issue is the effects of the proposed timber sale on special habitats in the planning area.

Indicator: The loss of special habitats that may reduce biodiversity in the area.

Background to Issue: A few special habitat types exist in the planning area that are more common in northern Idaho but rather rare on the Payette National Forest. These include the grand fir/queen cup beadlily and grand fir/western goldthread habitat types and unusual birch stands along Hazard Creek. Reductions in these special habitats would also reduce the biodiversity in the area.

The fourth issue is the effects of the proposed timber sale on threatened, endangered, and sensitive plant species.

Indicator: Population losses of puzzling halimolobus and the effects on viability of the species.

Background to Issue: The sensitive plant, puzzling halimolobus (*Halimolobus perplexa* var. *perplexa*), occurs in the planning area, and timber harvest activities have the potential to directly or indirectly affect populations of this plant and threaten its viability.

TIMBER

The first issue is the need to treat timber stands in order to improve health and vigor, and to meet future growth and productivity projections made in the Payette Forest Plan.

Indicators:
- Acres treated
- Percent of acres treated in relation to the suited acres in need of treatment
- Timber volume harvested

Background To Issue: Timber harvest can be used to improve growth, health, and vigor. Treating suited timber stands is a basic premise in the Forest Plan for maintaining healthy stands and meeting timber production objectives. The harvest of trees, surplus to other resource needs, also supplies the local economy with products and jobs.

The second issue is the silvicultural system or systems used to manage timber stands and the type of logging methods used in harvesting.

Indicators:
- Acres by cutting method
- Acres by logging method

Background To Issue: Clearcutting has become a national issue to some members of the public and to the Forest Service. Recent Forest Service direction is to reduce clearcutting except where there is clear evidence that it is needed. Another public concern is the construction of roads for harvest operations. Some suggest Helicopter logging as a means to reduce road construction and its impacts on other resources.

The third issue is the growth, health, and vigor of timber stands. This issue includes the impacts from insects and disease, regeneration methods, and the salvage of dead and dying timber.

Indicators:
- Stand growth as a percent of site potential
- Acres by regeneration method

Background To Issue: Forest sites have a certain inherent ability to grow trees. Often, tree growth in timber stands is below the site's potential because the trees are crowded, old, or diseased. Dead and dying trees can be harvested to provide products and jobs to the local economy. By harvesting trees that are no longer growing at optimum rates, growth rates can be improved in residual stands. This also improves the health and vigor of the residual stands, making them more resistant to insects and disease.

Although managing timber stands intensively is not a management objective for most of the Hazard Helicopter planning area, overall stand heath and vigor can be improved by increasing stand growth through harvest treatments.

WILDLIFE HABITAT

The first issue is the effects of the proposed sale on special wildlife habitats in the planning area and the biological diversity they represent.

Indicators:
- Effects on wildlife biological diversity
- Effects on special wildlife habitats

Background To Issue: Five special wildlife habitats have been identified in the planning area. Certain wildlife species can be dependent on special wildlife habitats for their survival. A loss of these habitats may cause species to disappear from the planning area, resulting in a local loss of biological diversity.

The second issue is the effects of the proposed sale on habitats of Management Indicator Species.

Indicators:
- Effects on Rocky Mountain elk habitat
- Effects on pileated woodpecker habitat
- Effects on Williamson's sapsucker habitat
- Effects on vesper sparrow habitat

Background To Issue: The National Forest Management Act directed National Forests to identify MIS (Management Indicator Species). MIS are species whose populations levels indicate the effects of Forest management activities on the habitat on which they depend. By monitoring MIS and their associated habitats, Forest managers can estimate effects on all wildlife species on the Forest and develop management activities that do not conflict with wildlife management goals and objectives. The species listed above were selected as MIS because their habitat requirements encompass a diverse range of forest successional stages. Elk, pileated woodpeckers, and Williamson's sapsuckers currently use the planning area. Vesper sparrow have not been seen, but suitable habitat does exist in the area.

The third issue is the effects of the proposed sale on the habitats of threatened, endangered, and sensitive wildlife species.

Indicators:
- Effects on threatened and endangered species and their habitats
- Effects on sensitive species habitats and population viability

Background To Issue: Timber harvest and associated activities can potentially destroy or degrade habitats of these species, which can reduce populations and distribution of the species, reduce population viability, and contribute to a trend toward federal listing of sensitive species.

Only goshawk have been found in the planning area, and timber harvest could reduce habitat for this and other sensitive species for which suitable habitat is present.

RECREATION RESOURCES

The issue is the effects of the proposed sale on the recreation opportunities in the planning areas and in the overall roadless area. This issue includes effects on trails and on visual quality.

Indicators:
- Length of trail corridor modified (miles)
- Acres visually affected
- Acres not meeting visual quality objectives
- Change in recreation opportunity spectrum (acres)
- Change in recreation visitor days
- Big-game hunting opportunities

Background to Issue: Timber harvest activities can modify the existing scenery as seen from trails, roads, lookouts, and other sensitive locations. The proposed activities would change the recreation setting and opportunities in the area, and therefore result in changes in the amount and types of recreation use. Much of the recreation in the planning area is hunting use, but hiking, camping, motorbike riding, mountain bike riding, horse riding, and fishing-related recreation also occur at relatively low densities. In the roaded portions, driving for pleasure, firewood cutting, and gathering berries, mushrooms, and other forest products also occur. The loss of trails to timber sales through road building and logging is also of concern to trail users.

Four system trails cross part or all of the planning. None of the trails has proper right-of-way over private land to allow legal public use, but the opportunities exist to provide a quality recreation experience along each trail. Harvest units could directly affect the Grass Mountains Trail.

ROADLESS CHARACTER AND WILDERNESS POTENTIAL

The issue is the effects of the proposed sale on the roadless character and wilderness potential of the French Creek/Patrick Butte Roadless Area.

Indicators:
- Acres in the roadless area eligible for future wilderness consideration
- Wilderness attributes: natural appearance, natural integrity, opportunities for solitude, opportunities for primitive recreation, and special features.

Background to Issue: The French Creek/Patrick Butte Roadless Area covers 161,936 acres of Payette National Forest land between Payette Lake and the Salmon River. Most of the Hazard Helicopter planning area lies within the roadless area. The Forest Plan allocated the roadless area to primarily three prescriptions: timber management, backcountry management with limited timber harvest, and backcountry with no timber management. Nevertheless, public opinion remains divided over the allocation, and interest remains high regarding the effects of development on the roadless character and wilderness potential of the roadless area.

ECONOMIC, SOCIO-ECONOMIC, AND SOCIAL

The issue is the economic, socio-economic, and social effects of the timber sales. This includes the economic efficiency of each sales as measured by present net value, the effects on jobs and income, and the effects on local social groups.

Indicators:
- Present Net Value (deficit sales)
- Jobs and income
- Payments to counties
- Social conflict

Background to Issue: Below-cost or deficit sales are of national concern. The Forest Service attempts to design timber sales with the most efficient combination of logging methods, road systems, and silvicultural prescriptions to meet the objectives of the proposed action. Economic analysis examines the costs and benefits of project alternatives to ensure that efficient methods are considered in choosing an alternative. In National Forest management, economic efficiency is usually measured in terms of present net value.

Traditionally, the economic well-being of communities near the Forest has depended on resources from the Forest—primarily timber, rangeland, and recreation. This issue focuses on the jobs and income in the timber, livestock, and recreation industries, and payments to the four affected counties.

Society is the social environment made up of social groups, social values, and social systems. This EIS looks at how the timber sale may affect these elements of society.

ROADS AND ACCESS MANAGEMENT

The issue is the amount of roads reconstructed and how road access is managed both during and after the sale.

Indicators:
- Miles of road reconstructed
- Miles of road open to public during and after sale
- Number of right-of-ways to be obtained

Background to Issue: Whether specific roads are open or closed to the public, and at what times of the year, has been of great public interest on the Payette Forest in recent years. No new roads will be constructed with this sale; however, road reconstruction and access to the area through private land are concerns and offer opportunities for future management.

OTHER RESOURCES

Besides the issues identified above, the ID Team also analyzed the effects of the proposed alternatives on other relevant resources, including air quality, fire and fuels, geology, minerals, range, and cultural resources. These resources will be discussed briefly in Chapter 3 in the context of their ecological niches. Resources whose consideration is required by law or regulation—such as wetlands and floodplains—are covered at the end of Chapter 3, under Specifically Required Disclosures.

PERMITS, LICENSES, AND OTHER ENTITLEMENTS

The entire planning area lies on National Forest System lands. The project can be implemented through a standard Forest Service timber sale contract with project-specific clauses. Access to the planning area, however, is currently through BLM (Bureau of Land Management) and private land, and legal right-of-ways must be obtained before the project is implemented. No other federal, state, or local permits, licenses, or entitlements are required.

Chapter 2

Alternatives Considered

Contents

Chapter 2
Alternatives Considered

INTRODUCTION

Chapter 2 describes the management alternatives considered for the proposed project and summarizes the effects of those alternatives on the issues presented in Chapter 1. The chapter is organized into the following sections:

- **Range of Alternatives** - briefly discusses the range of alternatives considered in the project analysis, including alternatives eliminated from detail study.
- **Alternatives Considered in Detail** - describes the management alternatives that were analyzed in depth by the ID Team, focusing on the salient features of each alternative.
- **Elements Common to All Action Alternatives** - describes features that are part of every action alternative considered in detail.
- **Mitigation Measures and Management Requirements** - lists measures and requirements that must be implemented under any action alternative.
- **Comparison of Alternatives** - summarizes the effects of the alternatives considered on the issues presented in Chapter 1.
- **Identification of the Preferred Alternative** - names the alternative preferred by the Responsible Official.

RANGE OF ALTERNATIVES

The range of alternatives and elements presented in this chapter was determined from the scope of the proposed project. This scope was largely defined by the issues and desired future condition described in Chapter 1. Other influences on the scope of the project included Forest Plan direction goals and objectives, Forest Plan standards and guidelines, economic viability, and federal laws, regulations, and policies. Within these parameters, the alternatives developed by the ID Team display a reasonable range of outputs, treatments, costs, management requirements, mitigation measures, and effects on resources.

In addition to the alternatives considered in detail, the ID Team examined a number of other alternatives during the analysis process. Although these alternatives contributed to the reasonable range, they were eliminated from further consideration for the reasons listed on the following page.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

The **Economic Emphasis Alternative** emphasized economic practicality and efficiency. Road layouts, harvest methods, and other factors affecting the economics of an alternative were considered. Because neither law nor public issues dictate maximizing profit over all other resources, and because all alternatives and sales were made as economically efficient as possible, it was not considered necessary to continue with the Economic Emphasis Alternative.

Initially, a **Wildlife Emphasis Alternative** was developed to protect wildlife (particularly big-game) habitat, a **Biodiversity Emphasis Alternative** was developed to protect biological diversity, and a **Roaded Only Emphasis Alternative** was developed that excluded harvest and road construction form the roadless portion of the planning area. Features from these three alternatives were eventually combined to form Alternative C.

A **Timber Emphasis Alternative** was considered but dropped because Forest Plan direction is for extensive timber management in much of the planning area. However, the ID Team incorporated appropriate features from this alternative into Alternative B (Proposed Action).

ALTERNATIVES CONSIDERED IN DETAIL

The ID Team developed and analyzed in detail four alternatives for the Hazard Helicopter timber sale. All alternatives meet Forest Plan standards and guidelines for all resources unless otherwise noted.

The alternatives are presented in terms of timber sale activities, such as acres by cutting method and miles of road reconstructed. Cutting unit locations, road miles, treated acres, and timber volume are approximations based on the best available information. Table 2-1 on page 2-10 displays the timber outputs and activities for the alternatives.

ALTERNATIVE A (NO ACTION)

This alternative is the No Action theme required by the National Environmental Policy Act. Current management of the area would continue, as directed in the Forest Plan, except that the proposed timber sale (and its associated activities and mitigation measures) would not be implemented. The roadless character and wilderness potential of the area would not be affected by development, thus providing the opportunity to re-evaluate the area for wilderness designation when the Forest Plan is revised.

Timber - Conduct no scheduled timber management at this time. However, if wildfire or major outbreaks of insects or diseases affect the timber, then the Forest may plan, analyze, and implement appropriate salvage or prescriptive harvests in the area.

Fuels - Create no project-caused fuels (slash). Prescribe burn occasionally in roaded portions of planning area to reduce fuel loadings.

Roads - Continue to maintain existing roads. No roads would be constructed, reconstructed, or improved. See Figure 2-1 for the existing road locations in the area.

Figure 2-1. The Hazard Helicopter Timber Sale Planning Area

ALTERNATIVE B (PROPOSED ACTION)

This alternative would meet the Forest Plan Activity Schedule (Appendix A, updated 1993) as closely as possible, while updating cutting methods and road locations to reflect the latest site-specific information. Other resources (fisheries, range, recreation, roadless/wilderness, water, wildlife, etcetera) would be managed at levels approximating Forest Plan direction.

Timber - Use mainly even-aged timber management to bring stands under extensive management and meet the ASQ (allowable sale quantity) for the long term. Harvest 7.1 million board feet from 836 acres using the following prescriptions:

Shelterwood (SW3) ....734 acres
Sanitation Salvage ....102 acres
Clearcut with Reserve Trees .... 0 acres

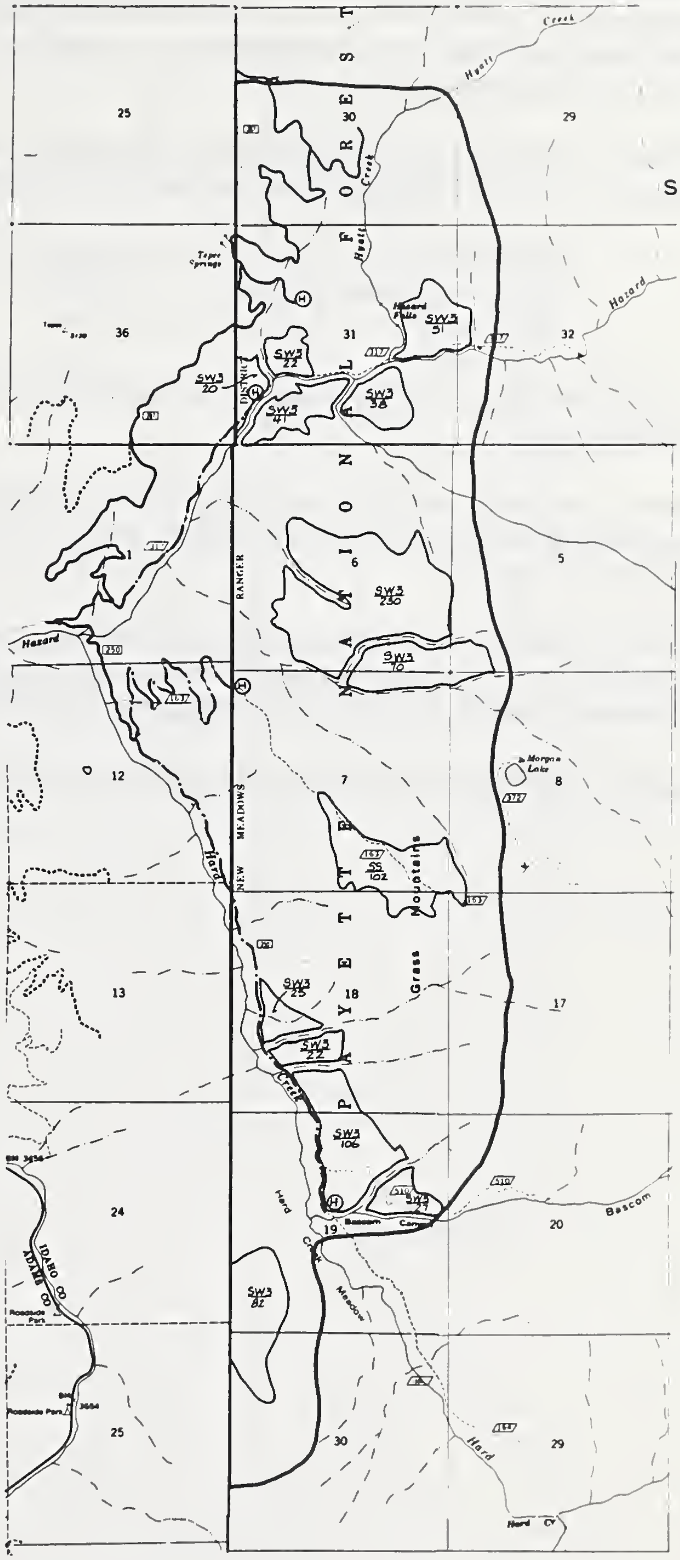
Use helicopter logging on all 836 acres. Conduct no planting or thinning.

Fuels - Treat logging slash by jackpot burning on 391 acres, by YUM (yard unmerchantable material) pile and burning on 255 acres, and by lop and scatter on 190 acres of harvest treatments.

Roads - Reconstruct and maintain roads to the minimum standards necessary to meet current harvest needs and to prevent unacceptable resource damage. Construct no new roads and reconstruct 6.5 miles of existing roads to access helicopter landings.

Figure 2-2 shows proposed road reconstruction and harvest unit locations for Alternative B.

Figure 2-2. Proposed Harvest Units and Road Reconstruction for Alternative B



LEGEND

Planning Area Boundary

Proposed Harvest Unit

Proposed Helicopter Landing

Existing Road

Proposed Road Reconstruction

Trail

Unit Designation:
SS = Prescription
102 Acres

Prescriptions:
SW3 = Shelterwood 3
SS = Sanitation Salvage

ALTERNATIVE C

This alternative harvests timber below the Forest Activity Schedule level to accommodate other resources such as roadless character, old growth, fragmentation, and biological corridors. Road reconstruction and timber management are restricted to the roaded and developed portions of the planning area.

Timber - Manage suited timber stands outside the roadless area using even-aged harvest treatments. Harvest 2.4 million board feet from 205 acres using the following prescriptions:

Shelterwood	172 acres
Clearcut with Reserve Trees	33 acres
Uneven-aged	0 acres

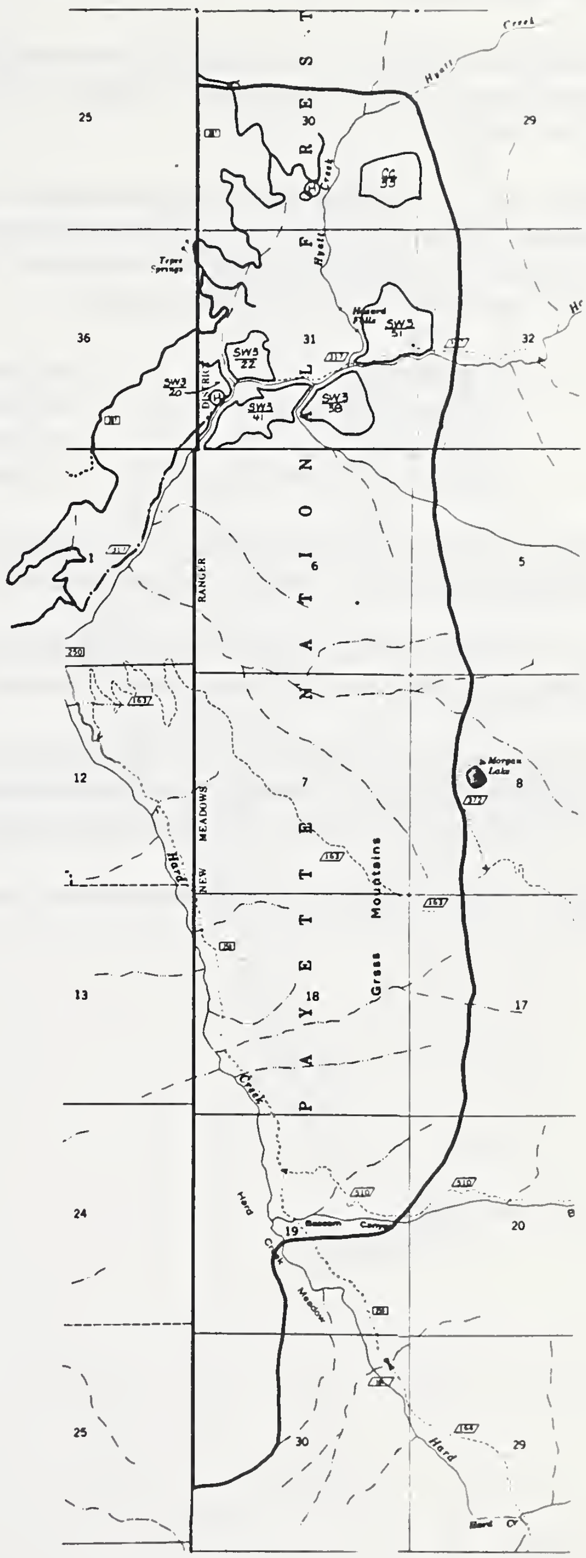
Use helicopter logging on all 205 acres. Plant seedlings on 33 acres to bring the stand up to stocking potential.

Fuels - Treat slash created during logging by broadcast burning the 33-acre clearcut, lopping and scattering 105 acres, by jackpot burning 39 acres, and by YUM pile and burning 28 acres of harvest treatments.

Roads - Reconstruct and maintain roads to the minimum standards necessary to meet current harvest needs and to prevent unacceptable resource damage. Construct no new roads and reconstruct 1.2 miles of existing road to access helicopter landing.

Figure 2-3 shows proposed road reconstruction and harvest unit locations for Alternative C.

Figure 2-3. Proposed Harvest Units and Road Reconstruction for Alternative C



LEGEND

Planning Area Boundary

Proposed Harvest Unit

SW3
51

Proposed Helicopter Landing

Ⓗ

Existing Road

Proposed Road Reconstruction

Trail

Unit Designation:
SW3 = Prescription
38 Acres

Prescriptions:
CC = Clearcut with Reserve Trees
SW3 = Irregular Shelterwood

ALTERNATIVE D

This alternative emphasizes uneven-aged timber management, while producing a reduced amount of timber volume. Visual quality, wildlife habitat, and biological diversity also receive some emphasis.

Timber - Use harvest prescriptions that create small openings and emphasize uneven-aged management where appropriate. Use sanitation salvage prescriptions in areas of high-risk trees to reduce mortality and risk of insect and disease attacks. Harvest 3.0 million board feet from 555 acres using the following prescriptions:

Uneven-aged	390 acres
Sanitation Salvage	102 acres
Shelterwood	63 acres
Clearcut with Reserve Trees	0 acres

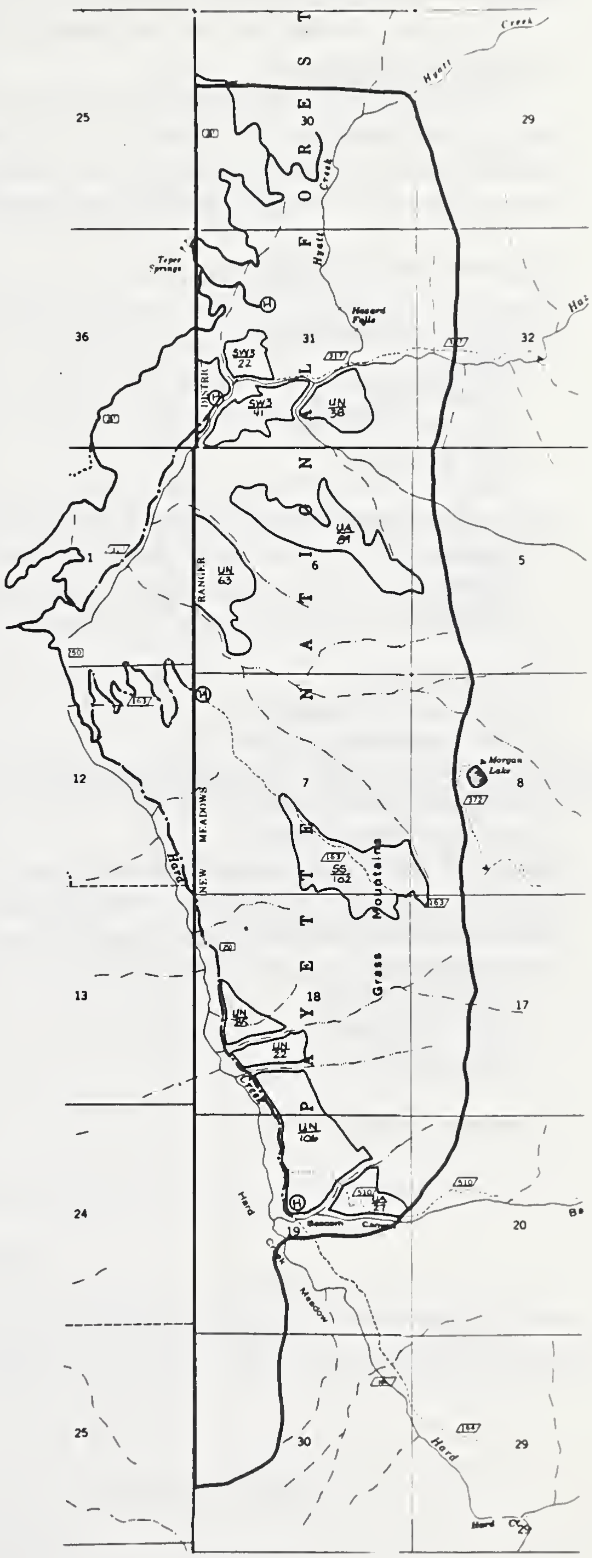
Use helicopter logging on all 555 acres. Plant seedlings on 78 acres and encourage natural regeneration on 39 acres to bring stands up to stocking potential.

Fuels - Treat activity-created fuels by jackpot burning 230 acres, by YUM pile and burning 186 acres, and by lop and scatter on 180 acres of harvest treatments.

Roads - Reconstruct and maintain roads to the minimum standards necessary to meet current harvest needs and to prevent unacceptable resource damage. Construct no new roads and reconstruct 6.5 miles of existing roads to access helicopter landings.

Figure 2-4 shows proposed road reconstruction and harvest unit locations for Alternative D.

Figure 2-4. Proposed Harvest Units and Road Reconstruction for Alternative D



LEGEND

Planning Area Boundary

Proposed Harvest Unit

SW3
51

Proposed Helicopter Landing

H

Existing Road

Proposed Road Reconstruction

Trail

Unit Designation:
UN = Prescription
38 Acres

Prescriptions:
- UN = Uneven-aged Normal
- UA = Uneven-aged Accelerated
- SW3 = Irregular Shelterwood
- SS = Sanitation Salvage

Table 2-1. Outputs and Activities by Alternative

	ALTERNATIVE			
OUTPUT OR ACTIVITY	A	B	C	D
Acres in Planning Area	4141	4141	4141	4141
Acres Treated	0	836	205	555
Harvest Volume (MMBF)	0	7.1	2.4	3.0
Acres by Cutting Method:				
Clearcut	0	33	0	0
Shelterwood	0	734	172	63
Sanitation Salvage	0	102	0	102
Uneven-Aged	0	390		
Acres by Logging Method:				
Tractor	0	0	0	0
Skyline	0	0	0	0
Helicopter	0	836	205	555
Acres Planted	0	0	33	78
Acres Natural Regeneration	0	0	0	39
Acres Precommercial Thin	0	0	0	0
Road Miles Constructed	0	0	0	0
Road Miles Reconstructed	0	6.5	1.2	6.5
Acres of Landings Constructed	0	10	4	10
Acres of Fuels Treatment:				
Jackpot Burn	0	391	39	230
YUM Pile and Burn	0	255	28	186
Lop and Scatter	0	190	105	139
Broadcast Burn	0	0	33	0
Firewood (cords)	0	510	56	372

ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

All of the action alternatives have certain things in common. They all comply with state and federal laws and regulations. Except as noted, they all meet Forest Plan standards and guidelines for all resources. In addition, the action alternatives share the following elements:

- **Timber Sale Date** - The Hazard Helicopter sale is scheduled for offering in 1994.

- **General Planning Boundary** - To maintain continuity during analysis, all alternatives developed for a sale have the same planning area boundary (Figure 2-1).

- **Outyear Timber Sales** - The Forest Plan Activity Schedule includes 9 other sales in the French Creek/Patrick Butte Roadless Area. These sales are discussed to determine their potential contribution to cumulative effects in the area. They are not part of the proposed action. To be consistent in comparing alternatives and analyzing cumulative effects, these outyear sales are evaluated as shown in the Activity Schedule.

- **Monitoring and Evaluation** - Under all action alternatives, the Forest will monitor implementation according to the Monitoring and Evaluation Plan in Appendix B. The Forest will evaluate whether the standards and guidelines for each resource are appropriate, and indicate whether the resource objectives, management direction and Best Management Practices have been met. If they are not met, adjustments may occur for this project and future projects.

MITIGATION MEASURES AND MANAGEMENT REQUIREMENTS

The action alternatives would comply with Forest Plan standards and guidelines during implementation. In addition to those standards and guidelines, the following mitigation measures and management requirements and have been developed specifically for this sale. No action alternative will be implemented without also implementing these measures and requirements.

AIR

Water roads during dusty conditions.

Burn slash piles only under the following conditions:

- Ignitions occur between 6 a.m. and noon,
- Winds are 1 to 10 miles per hour from the south or southwest,
- A Good-to-Excellent smoke dispersion prediction from the National Weather Service,
- Burn a maximum of 25 acres or 100 piles of landing or harvest unit machine-piled slash per day, and
- Observe a one-day waiting period between ignitions.

For Alternative C, broadcast burn only under the following conditions:
- Ignitions occur between 6 a.m. and noon,
- Winds are 1 to 7 miles per hour from the south or southwest,

- A Fair-to-Excellent smoke dispersion prediction from the National Weather Service,
- All created slash has a minimum drying period of two summer months, and
- Observe a one-day waiting period between ignitions.

WATER

Apply BMPs (Best Management Practices), Site-Specific Best Management Practices, and Soil and Water Conservation Practices as summarized in Appendix H. Application of the above will meet the intent of Forest mitigation measures as described in the Forest Plan, page IV-73.

Avoid drafting water from sites where streambanks are steep, poorly vegetated, or highly erodible.

SOILS

The implementation of specific management requirements and the following mitigation measures would ensure that all alternatives meet Forest Plan standards and guidelines (Forest Plan, pages IV-72 to IV-74).

- Apply appropriate BMPs, as summarized in Appendix H, to reduce potential impacts from specific management activities. These mitigation measures are further described in Forest Service Handbook 2509.22, the Soil and Water Conservation Practices Handbook. Implementation of BMPs will meet the intent of erosion-control guidelines as described in the Forest Plan on page IV-73.

- Restrict or minimize surface impacts on stream terraces, floodplains, and seasonally wet soils adjacent to drainage channels to prevent detrimental disturbance and potential rill or gully erosion from altered runoff patterns.

- It is assumed that all landings will be retained for future use. Disturbed areas shall be stabilized with appropriate erosion-control measures that include structures (water bars) that deflect drainage concentrations, and revegetation (seed, fertilizer, mulch) for surface protection prior to fall and spring runoff.

- Minimize surface disturbance on shallow (less than 20 inches) soils to reduce the potential for accelerated erosion on fragile soils with low soil-loss tolerance.

- Retain 10 to 15 tons per acre of evenly distributed large woody material (where available) to provide organic matter for long-term nutrient cycling. In areas with shallow soils or steep slopes, retain maximum allowable levels of organic materials to maintain ground cover protection for erosion control. This may be accomplished by lopping and scattering the fine (less than 3 inches in diameter) woody material. Excessive fuels on steep slopes can be reduced by burning small concentrations of logging slash. Slash burning should be conducted under moist soil and duff conditions if possible.

FISH HABITAT

Establish a 300-foot, no-cut buffer strip on each side of Hazard and Hard Creeks. Establish a 100-foot, no-cut buffer strip on each side of all other Class I and II streams.

Gravel all approaches to crossings of live streams and dry streams where the intermittent stream has a defined bed and banks.

Construct earthen berms around all fuel stored at or near helicopter landings. Place fuel stored in 55-gallon containers on wooden pallets. On-site fuel storage over 500 gallons will require an approved spill contingency plan. This shall contain as a minimum the response procedures for handling a spill, the measures to be taken, and a map of designated containment locations. This plan and a spill response kit will be carried in all transport vehicles. A pilot car with a CB (citizens band) radio will precede the fuel transport vehicle while it is transporting fuel over unsurfaced, dirt roads.

Develop a cooperative road-use plan with the BLM in 1993. Identify seasonal road use, annual maintenance responsibility, and improvement opportunities.

FIRE AND FUELS

Treat fuels to reduce excess accumulations of project-created fuels and minimize the potential spread, size, impacts, and suppression costs of wildfires. Retain at least 10 to 15 tons of large woody material per acre for soil productivity.

Develop burn plans with site-specific prescriptions that include factors to minimize impacts to other resources, including soil and air quality.

BIOLOGICAL DIVERSITY

Maintain snag density by retaining all snags in harvest units that are not safety hazards. Retain at least 3 large (greater than 24 inches in diameter), healthy ponderosa pine, grand fir, or Douglas-fir trees per acre as replacement snags.

Avoid populations of the sensitive plant species *Halimolobus perplexa* var. *perplexa* with heavy equipment operation. (See the planning records for mapped locations.)

TIMBER

Keep openings created by harvest smaller than 40 acres. Keep the average size of created openings smaller than 30 acres.

Log with helicopters in Management Area 10, instead of with tractors or skyline.

Identify and retain old-growth timber stands to at least the 5 percent standard shown in the

Forest Plan. Use riparian areas and unsuited timber stands to make up the majority of the old-growth stands. Manage additional stands for old-growth characteristics as needed to meet Forest Plan standards and guidelines.

All prescriptions in this EIS, including clearcutting, allow and encourage the retention of advanced regeneration suitable for future crop trees where feasible. These trees should have good form, have at least 40 percent live crown, be young enough to have good future growth potential, and be free of insects and disease. In addition, selected windfirm reserve trees (those left in a harvest unit for wildlife or other resource purposes) will be retained.

WILDLIFE HABITAT

Follow the biological evaluation review recommendations of the Forest Wildlife Biologist to protect sensitive species populations or habitat.

For each year that harvest is scheduled between March 1 and June 31, survey potential peregrine nest cliffs before beginning harvest activities. If nest sites or peregrines are detected, consult with the U.S. Fish and Wildlife Service before implementing harvest.

For each year that harvest is scheduled, conduct howling surveys for wolves before any project activities take place. If wolves are detected during the surveys, consult with the U.S. Fish and Wildlife Service before implementing any activities.

Maintain Elk Habitat Effectiveness on summer range through the careful placement of cutting units or by closing roads.

Protect elk wallows during the timber sale activities by providing thermal and hiding cover for two sight distances around the wallow, and by excluding equipment operation from the wallow. (The identified wallow sites are on file with the New Meadows District wildlife biologist.)

RANGE

Continue to treat populations of leafy spurge, as well as any other noxious weeds found in the planning area. Eradication may include spraying, grubbing, or other methods as needed.

Seed grass on up to 50 acres of suitable areas outside of harvest units to improve forage conditions.

CULTURAL RESOURCES

For all known sites and any sites subsequently located, the Forest will follow standard procedures to avoid or mitigate damage.

If avoidance or mitigation is not possible, before any disturbance can occur, have a Forest Service archeologist inventory the site and determine if it is eligible for the National Register.

RECREATION RESOURCES

Within sight of Trails 317, 167, and 164:

- Cut tree stumps flush with the ground,
- Remove slash from trail,
- Dispose of saw-cut slash outside normal viewing locations, and
- If slash piles are burned, burn them completely.

ROADS AND ACCESS MANAGEMENT

Construct no new roads.

Design reconstructed roads to Payette Forest general standards for local logging roads.

Mitigate erosion on closed roads by such means as constructing water bars, seeding with grass, and piling slash at the base of fill slopes to trap sediment (slash filter windrows).

Post signs on main travel routes advising the public of increased logging traffic.

For the already roaded portion of the planning area, establish site-specific road access restrictions for roads each hunting season, consulting Idaho Fish and Game and considering other management activities in the area at that time.

COMPARISON OF THE ALTERNATIVES

Table 2-2 compares the alternatives, in terms of environmental effects and issues, in a summary form. See Chapter 1 for background on the issues. See Chapter 3 for a complete description of effects and the scientific basis for the results displayed in the comparison table.

Table 2-2. Comparison of the Alternatives by Issue and Indicator

Issues and Indicators	Alternatives			
WATER	**A**	**B**	**C**	**D**
Percent Over Natural Sedimentation				
Hazard Creek	1.1	1.5	1.3	1.4
Hard Creek	0.3	0.9	0.3	0.7
Percent of Subwatershed Harvested				
Hazard Creek	2.4	7.0	4.1	4.7
Hard Creek	1.0	5.3	2.4	3.1

Table 2.2 Continued

FISH HABITAT	A	B	C	D
Percent Over Natural Sedimentation				
Hazard Creek	1.1	1.5	1.3	1.4
Hard Creek	0.3	0.9	0.3	0.7
Proximity of Harvest to Perennial Waters				
Miles of Harvest Unit Boundary Along Streamside Management Zone	0	6.8	4.6	4.9
		No harvest within 300 feet of anadromous streams		
Miles of Road Reconstructed	0	6.5	1.2	6.5
Number of Stream Crossings Constructed	0	0	0	0
Risk of Toxic Spills	Low	Low	Low	Low

BIOLOGICAL DIVERSITY	A	B	C	D
Percent of Old Growth Left in Planning Area After Sale (Forest Plan Goal = 5%)	18	8	16	14
Remaining Unfragmented Forest Blocks Left in Planning Area After Sale	5 in all areas	1 in center	1 in center 2 in south	4 in all areas
Effects on TES Plants	none	nearby road and unit	none	nearby road and unit
Effects on Special Habitats				
Percent of Special Habitat Disturbed:				
Grand fir/Queencup beadlily	0	44	9	19
Grand fir/Western goldthread	0	100	0	0

TIMBER	A	B	C	D
Volume Harvested (MMBF)	0	7.1	2.4	3.0
Acres Treated	0	836	205	555
Percent of Acres Treated in Relation to Suited Acres in Need of Treatment	0	39	10	16
Growth as a Percent of Site Potential	-72	-18	-61	-50
Acres by Cutting Method				
Clearcut	0	0	33	0
Shelterwood	0	734	172	63
Commercial Thin	0	0	0	0
Uneven-aged	0	102	0	492

Table 2-2 Continued

	A	B	C	D
Acres by Logging Method				
Tractor	0	0	0	0
Skyline	0	0	0	0
Helicopter	0	836	205	555
Acres by Reforestation Method				
Acres Planted	0	0	33	78
Acres Natural Regeneration	0	0	0	39

WILDLIFE HABITAT	A	B	C	D
Loss on Wildlife Biological Diversity				
Planning Area:	slight risk	slight risk	no risk	no risk
Watershed Area:	slight risk	no risk	no risk	no risk
Effects on Special Wildlife Habitats	little or no change	decrease old growth, improve shrubs	little or no change	slight decrease in old growth, improve shrubs
Effects on Elk Habitat				
EHE Rating 2 Years After Harvest (Forest Plan Goal = 90)	97	89	97	97
Effects on Pileated Woodpecker Habitat				
Short Term:	none	moderate	slight	slight
Long Term:	none	moderate	slight	moderate
Effects on Williamson' Sapsucker Habitat	none	slight	none	slight
Effects on Vesper Sparrow Habitat	none	none	none	none
Effects on Threatened and Endangered Species Habitat				
Peregrine Falcon:	none	slight risk of disturbance	slight risk of disturbance	slight risk of disturbance
Gray Wolf:	none	slight improvement	slight improvement	slight improvement
Effects on Sensitive Species Habitat				
Old Growth Species Habitat:	none	moderately reduce	slightly reduce	slightly reduce
Effects on Sensitive Species Viability	none	slight risk for Goshawk	none	none

RECREATION RESOURCES	A	B	C	D
Change in RVDs (Percent Change by Year 2000)	30	69	73	93

Table 2-2 Continued

	A	B	C	D
Change In ROS Acres				
Roaded Modified Acres	550	550	650	550
Undeveloped Semi-primitive Acres	3550	2714	3345	2995
Developed Semi-primitive Acres	0	836	205	555
Acres Visually Affected	0	836	205	555
Acres Not Meeting VQOs	0	0	0	0
Miles of Trail Corridor Affected	0	0.75	0	0.75

ROADLESS CHARACTER AND WILDERNESS POTENTIAL

	A	B	C	D
Acres In Roadless Area Eligible For Future Wilderness Consideration	3,350	1,050	2,830	1,450
Effects on Wilderness Attributes				
Acres Lost Long-Term:	0	2,300	520	1,900

ECONOMIC, SOCIO-ECONOMIC, AND SOCIAL

	A	B	C	D
Present Net Value (Dollars)				
For All Resources:	266,000	798,000	393,600	343,900
For Timber Only:	0	532,200	126,700	79,600
Timber-Linked Jobs	0	7.1	2.5	3.1
Timber-Linked Income (Dollars)	0	313,000	105,800	132,300
Payments to Counties (Dollars)	0	136,400	48,600	58,700

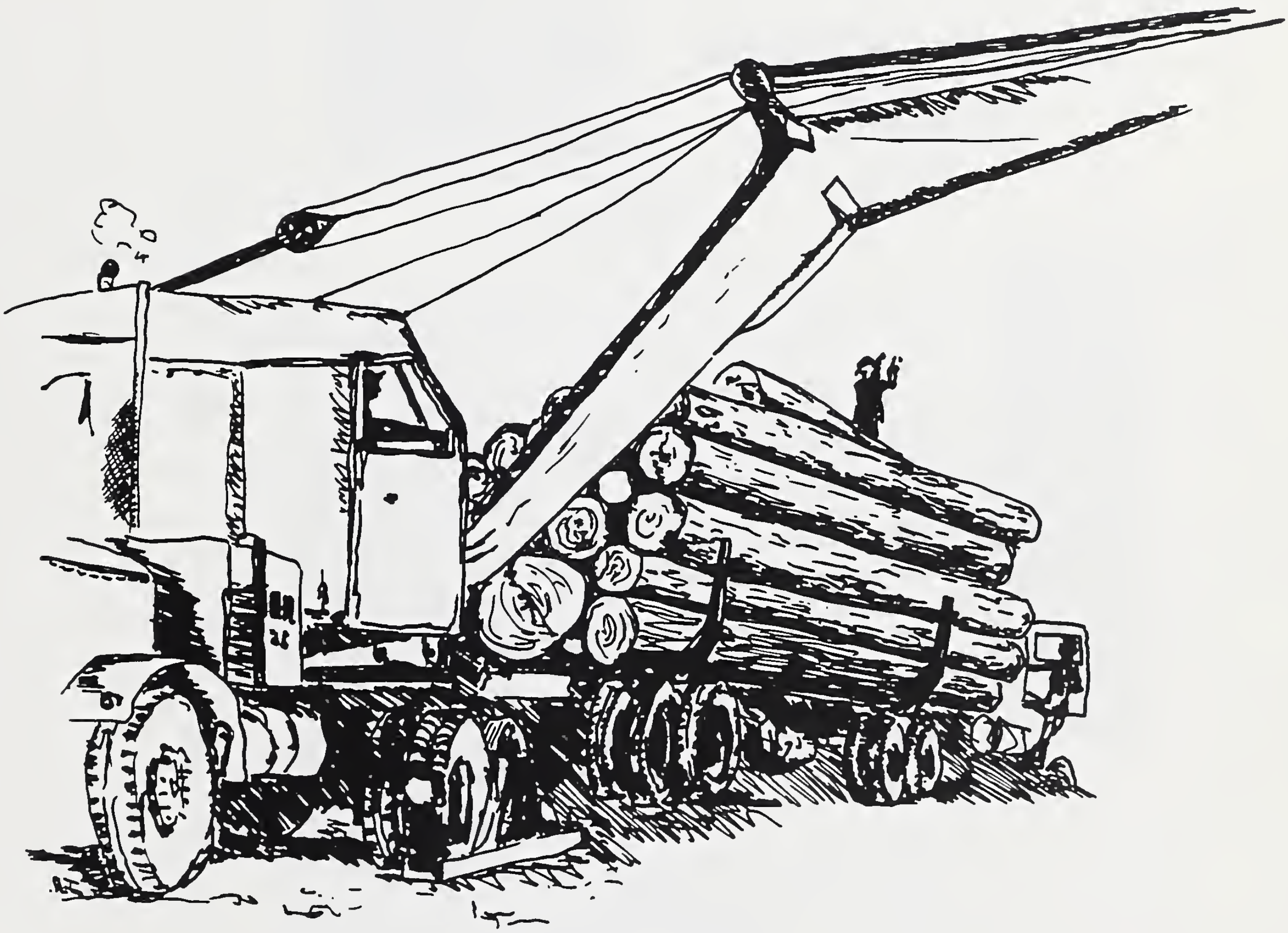
Social Conflict One timber sale alone would not cause social effects. Only a combination of current and future timber sales--along with other major activities such as recreational and residential developments--would result in descernible cumulative effects on social groups. See Social Effects section, Chapter 3.

ROADS AND ACCESS

	A	B	C	D
Miles of Road Reconstruction	0	6.5	1.2	6.5
Miles of Open Road During Sale	4.0	8.8	4.9	8.8
Miles of Open Road After Sale	4.0	8.8	4.9	8.8

IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Alternative B is the preferred alternative for the Hazard Helicopter timber sale. This alternative is described in detail on pages 2-4 to 2-5 of this chapter and also includes the management requirements and mitigation measures listed on pages 2-11 to 2-15.



Chapter 3

The Affected Environment and Environmental Effects

Contents

Chapter 3 Affected Environment and Environmental Effects

INTRODUCTION

Chapter 3 describes the physical, biological, and human resources of the environment that may be affected by the alternatives presented in Chapter 2, and the effects that the proposed alternatives may have on those resources. Affected environment and environmental effects have been combined into one chapter to give the reader a more concise and connected depiction of what the resources are and what may happen to them under the proposed alternatives. This organization also emphasizes the relationship between current conditions and desired future conditions, and how the alternatives bridge the gap between the two (see Forest Plan Implementation below).

Chapter 3 is organized by resource, including the resources that were presented as issues in Chapter 1 and other resources that are critical to the environment or that must be analyzed because of law, regulation, or policy. Resources that are also issues are clearly labeled as such by the shaded title box, and by the issue statement that appears directly beneath the resource title. Resources are grouped by whether they emphasize physical, biological, or human elements of the environment. Each resource section is organized in the following order:

- Resource Title
- Issue Statement or Resource Description
- Forest Plan Direction
- Desired Future Condition
- Affected Areas
- Affected Environment
- Environmental Effects/Direct and Indirect Effects by Alternative
- Cumulative Effects
- Forest Plan Consistency
- Irreversible and Irretrievable Commitments

Following the resource sections, at the very end of this chapter, is a section called, "Specifically Required Disclosures." This section covers resources whose consideration is required by law or regulation, such as wetlands and floodplains.

FOREST PLAN IMPLEMENTATION

Forest Plan implementation means moving from current conditions to desired future conditions, as described in the Forest Plan. This chapter details both the desired future conditions and the current conditions of the resources in and around the timber sale planning area. The sections t

describe how the proposed alternatives would affect the resources' current condition and how they would move that condition either toward or away from the desired future condition. The chapter thus provides a yardstick by which to measure the alternatives' ability to meet desired future conditions and Forest Plan direction.

AFFECTED ENVIRONMENT

The affected environment descriptions in this chapter focus on affected areas. An **affected area** is the area in which a specific resource may be affected by proposed management activities. Affected areas vary in size by resource and by the type of effect that may occur. For instance, the affected area for direct effects on soils may be the harvest units in a planning area where the soils are directly disturbed. However, the affected area for direct effects on water quality may be the drainages and wet areas in the entire planning area. And the affected area for cumulative effects on water quality may be the entire watershed that surrounds the planning area. Affected areas will be described for each resource in the following sections of Chapter 3.

A **planning area** is the area being studied for a proposed timber sale. It is usually larger than the eventual timber sale boundary or the harvest units therein (Figure 2-1).

ENVIRONMENTAL EFFECTS

The environmental effects form the scientific and analytic basis for the comparison of alternatives that appears at the end of Chapter 2. The Council on Environmental Quality Regulations recognizes three types of effects:

- **Direct effects** are caused by an action and occur at the same time and place.

- **Indirect effects** are caused by an action but occur later in time or farther removed in distance.

- **Cumulative effects** result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the other actions (40 CFR 1508.7 and .8).

Federal law and regulations also state that the Forest Service must disclose any irreversible or irretrievable commitments of resources that may result from the proposed alternatives.

- **Irreversible commitments** are permanent or essentially permanent resource uses or losses; they cannot be reversed, except in the extreme long term. Examples include minerals that have been extracted or soil productivity that has been lost.

- **Irretrievable commitments** are losses of production or use for a period of time. One example is suited timber land being used for a logging road. Timber growth on the land is irretrievably lost while the land is a road, but the timber resource is irreversibly lost because the land could grow trees again in the near future.

MAPS AND FIGURES

All maps and figures in this EIS are oriented so that north is at the top of the page.

The Physical Environment

Air, soil, water . . . these elements are the physical environment that form the foundation of an ecosystem. And like everything in an ecosystem, they are interconnected in form and function. The air and water work to break down rock into soil. The air cools in the lofty geology of mountains, condensing to rain and falling to earth, where the soil absorbs the water, and the moisture is eventually released back to the air in a cycle as old as life on earth. Air, soil, water . . . the building blocks of nature; the breath, bones, and blood of life.

Air

Air quality was not raised specifically as an issue for this sale. Worldwide, issues such as global warming, acid rain, and ozone depletion are serious concerns. The effects of the proposed alternatives on these global issues would be negligible, but on a local scale, activities such as slash burning, and dust and vehicle emissions from logging traffic, could temporarily reduce air quality. Project activities must comply with appropriate federal and state regulations, and Forest Service standards, and guidelines.

FOREST PLAN DIRECTION

The goal for air quality on the Forest is to manage Forest lands so that air quality will meet the National Clean Air Act and Idaho State clean air requirements for a Class II area. Specific requirements can be found in the USDA Forest Service/Idaho Department of Health and Welfare Division of Environment Memorandum of Understanding (February 5, 1988): Forest Service Manual Region 4 Supplement No. 75, Title 2500 - Watershed and Air Management (1990); and FSH 2509.19 Air Resource Management Handbook (1987).

In addition, proposed activities will meet the NAAQS (National Ambient Air Quality Standard) for PM-10 (particulate matter), and the PSD (Prevention of Significant Deterioration) and TSP (Total Suspended Particulate) for a Class II area.

DESIRED FUTURE CONDITION

Air quality and air quality-related values will be maintained or improved through implementation of the Forest Plan (page IV-87).

AFFECTED AREAS

For this proposed project, the affected area for air quality includes the planning area and the airshed that surrounds it. The area that may be directly, indirectly, and cumulatively affected is the Little Salmon River airshed where burning or log hauling would occur, usually above and downwind of the planning area. The small communities of Riggins, Pollock, and Pinehurst may also be affected, depending upon the burn intensity, time of year, inversions, and wind patterns.

AFFECTED ENVIRONMENT

The affected area described above is in a Class II airshed as designated by the 1977 Clean Air Act. The Class II designation allows moderate increases in new air pollution. Air quality in the planning area is generally excellent and meets guidelines established by Idaho air quality laws and the National Clean Air Act. Air quality may be degraded, and minor amounts of pollutants may occur from:

- Prescribed burning in the spring and fall by the Payette and surrounding Forests,
- Fire management fires burning in areas north and west of the Payette National Forest,
- Dust from adjacent roads and logging operations, and
- Wildfires during forest fire season.

These activities are generally of short duration, typically several days to several weeks long.

No prescribed burning, independent of the proposed timber sale, is planned in the planning area.

ENVIRONMENTAL EFFECTS

Project-caused prescribed burning, dust, and vehicle emissions, could temporarily impair visibility, create unpleasant odors, and cause eye irritation. Of these, smoke from prescribed burning would have by far the most effect. The local communities of Pinehurst, Pollock, and Riggins could be inconvenienced by smoky conditions for short periods. In case of an escaped burn, smoky conditions could persist in the Little Salmon River airshed for several weeks.

The Forest Fuels Specialist estimated the effects of prescribed burning using the SASEM (Simple Approach Smoke Estimation Model) developed by the BLM (Sestak and Riebau 1988). This model calculates total suspended particulate concentration (PM-10 equivalent), total particulates emitted (tons), and reduction in visual range due to smoke from burning. Input data includes size of burn, burn type, burn duration, fire line intensity, average fuel loading, type of fuel, emission rate, plume rise, wind speed and weather stability.

The SASEM model calculated the estimated output of PM-10 equivalent for excellent, good, fair, and poor dispersion days (as determined by the U.S. Weather Bureau), with wind speeds between 1 and 10 miles per hour. Under all dispersion days, the estimated PM-10 equivalent values were below the standard established by the Clean Air Act National Ambient Air Quality Standards.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

PRESCRIBED BURNING

After the timber sale, fuels specialists would prepare prescribed burning plans that would specifically address the conditions on each cutting unit. Burning would be conducted under favorable atmospheric and fuel-moisture conditions to minimize the amount and duration of particulate emissions. Leaving at least 10 to 15 tons of large woody material for soil productivity, wildlife, and site protection would also reduce smoke emissions as compared to intense wildfire. Most burning would occur at elevations above the populated areas and under conditions that provide for good smoke dispersal. The burn prescriptions would comply with State of Idaho Air Quality Regulations.

Smoke generated during prescribed burning would temporarily reduce air quality in all action alternatives. Smoke would diminish the visibility and scenic vistas within the area and off-site for short periods. Intensity of the impact would depend on the amount of fuels burned and the weather conditions during and immediately following the burning.

Table 3-1 displays the acres of logging slash that would be treated under each alternative.

Table 3-1. Acres of Slash Burning for the Hazard Helicopter Sale by Alternative

TYPE OF BURNING	Alternative A	Alternative B	Alternative C	Alternative D
Jackpot Burn	0	391	39	230
Broadcast Burn	0	255	28	186
YUM pile and Burn	0	0	33	0
TOTAL ACRES	0	646	100	426

Alternative A would not produce any harvest-generated smoke pollution. No natural fuels would be treated, however. As natural fuels increase over time, the potential for intense wildfires would also increase. Smoke from such wildfires would be substantial.

Alternative B would produce the most smoke and also reduce natural fuel loadings the most. **Alternative C** would produce the least smoke of the action alternatives, but would also reduce natural fuel loadings the least. **Alternative D** would fall between Alternatives B and C in terms of smoke produced and fuels treated. As stated above, however, all proposed prescribed burning would be below the Clean Air Act PM-10 standard for all dispersion days.

DUST AND VEHICLE EMISSIONS

Dust and vehicle emissions would temporarily reduce air quality in the immediate sale vicinity. All action alternatives would require the application of water to roads as needed to reduce dust. The amount of dust and vehicle emissions produced would depend largely on the amount of timber harvested and the number of logging truck loads required to haul the logs.

Table 3-2 displays the number of logging truck loads associated with the timber volume for each alternative.

Table 3-2. Logging Truck Loads for the Hazard Helicopter Sale by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D
Truck Loads	0	1420	480	600

Alternative A would not produce any additional dust and vehicle emissions. **Alternative B** would produce the most, followed in order by **Alternative D** and **Alternative C**. All effects from dust and emissions would be minor in comparison to those described for prescribed burning above.

CUMULATIVE EFFECTS

The smoke, dust, and vehicle emissions from implementation of the action alternatives would combine with air pollutants from other projects in the local area and with trace pollutants brought in by atmospheric conditions from other areas. Some short-term cumulative effects in the Little Salmon River drainage could affect the view from Highway 95 and the small communities of Pinehurst, Pollock, and Riggins. Smoke plumes would be visible from the highway and local communities.

FIREWOOD

Firewood is commonly used to heat homes in central Idaho. During harvest, the sale area would furnish firewood to many local residents. This firewood would substitute for other wood that would normally be burned and so would not be a new source of pollution. Therefore, this sale should not change the home heating emissions produced in the local area.

FOREST PLAN CONSISTENCY

All alternatives would meet Forest Plan direction for air quality. Prescribed burn plans would follow Forest Plan standards and guidelines for smoke management (page IV-126).

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

Alternative A would not create any harvest-generated air pollution. Natural fuels and the risk of future intense wildfire and associated emissions would increase. Wildfires are random events; the severity of their impacts on air quality varies with fire size, intensity, topography, fuel type, and weather conditions. Wildfires generally occur at times and under conditions that produce more emissions than a prescribed fire of equal size.

Although most smoke, dust, and vehicle emission effects under the alternatives would be short term, a small amount of material--primarily gases--would remain in the atmosphere and irreversibly affect air quality.

Soils

The effects of the proposed sale on soil productivity was not raised as an issue. However, maintaining long-term soil productivity is an integral part of National Forest Management. Therefore, an evaluation of the potential effects on the productivity of the land is essential for integrated management of forest resources.

FOREST PLAN DIRECTION

Ensure that soil productivity is protected or maintained at a level equal to or greater than 90 percent of natural potential (page IV-73). This is accomplished by: a) limiting the extent of detrimental disturbance to no more than 20 percent of the activity area following project implementation, and b) limiting total soil resource commitment to no more than 5 percent of the activity area (this is a cumulative 5 percent that includes existing land uses such as roads and trails).

DESIRED FUTURE CONDITION

The productivity of the soil is maintained at acceptable levels to provide sustained yields of timber and other managed vegetation. Specific management requirements and mitigation measures are applied to land-disturbing activities to minimize the extent of detrimental disturbance and the area of soil committed to non-productive land uses. Forest activities are managed to maintain or enhance long-term soil productivity.

AFFECTED AREA

The soil resource may be directly, indirectly, and cumulatively affected within the timber-sale planning area boundary. See planning area map, Chapter 2, Figure 2-1.

AFFECTED ENVIRONMENT

Soil inventory information (Soil-Hydrologic Reconnaissance of New Meadows Ranger District, 1973) and a Mass Stability Hazards inventory (1989) have been collected for the planning area. These inventories delineate areas of land that have similar soil properties, landscape characteristics, and existing mass movements. The inventory information is suitable for project-level analysis in areas of extensive management with rugged topography that severely limits land use activities. Management interpretations were developed from inventory data and technical guides to assess potential impacts on the various soils from timber harvest activities. Specific information about soils and other landscape features is available at the Supervisor's Office in McCall, Idaho.

LANDSCAPE TOPOGRAPHY

The landscape is generally characterized as dissected mountainous terrain with steep canyon lands and V-shaped valleys. Faulting and uplift followed by glaciation and erosional action have been the dominant geomorphic processes that shaped existing landforms. Approximately 60 percent of the planning area is comprised of rugged topography with slopes ranging from 50 to 70 percent; these lands occupy lower footslopes to upper ridgecrests at elevations of

3,800 to 6,500 feet. Moderately steep landforms (25 to 50 percent slope) comprise the remaining 40 percent of the area; these lands consist of broad ridges, plateaus, and mountain summits that occur mainly in the northern and central portions of the planning area. The moderately sloping lands are commonly surrounded by steep, rocky slopes that limit access and management options.

GEOLOGY

The surface geology is comprised mainly of metamorphosed granitic rocks (about 85 percent of the planning area) that weather into marginally stable soils with coarse-to-medium textures. The northern portion (about 15 percent) of the planning area contains basalts of the Columbia River formation. The transition between rock types occurs along the ridgetop north of Hazard Creek. The basalt soils are generally less erodible, darker in color, and more productive than meta-granitic soils.

SOILS

The soils in the planning area have developed in response to extreme physiographic differences in slope, aspect, and elevation. Shallow (less than 20 inches) to moderately deep (20 to 40 inches) meta-granitic soils occur on extremely rocky landtypes and steep slopes throughout the area. These soils generally occur in an intricate pattern and cannot be practically separated on maps, but it is estimated that 20 to 40 percent of these lands contain shallow soils with some exposed bedrock. Soil depth and low moisture-holding capacities limit timber productivity and reforestation potential on harsh sites; soils on ridges and south or west-facing aspects are usually the least productive. Most of these soils are well drained and have weak-to-moderate development. The inherent erosion hazard is moderately high due to steep slopes and greater amounts of surface runoff. Several small areas of rock fall and talus slopes exist in the northern portion of the planning area, but there is low risk for larger mass movements such as slides or slumps.

The basalt soils occur on moderately steep landforms that typically have less rock fragments than the more rugged terrain. These moderately deep soils have medium to relatively fine textures with well-developed profiles and adequate soil moisture for vigorous plant growth. Basaltic soils are highly susceptible to compaction during moist soil conditions. The inherent erosion hazard is generally rated moderate, but surface erosion can become excessive on the steeper slopes. There are no existing mass movements, and the risk for potential slides and slumps is low.

CURRENT SITUATION

The current effects of management activities on soils are associated with past timber harvest, limited livestock use, 3 miles of recreation trails, and approximately 8.5 miles of existing roads. Timber management activities (1988) were concentrated on approximately 117 acres of the basalt soils. The rugged topography limits suitable range, and livestock impacts are primarily related to sheep trailing. Surface erosion rates are essentially restored to natural levels, except for accelerated erosion associated with existing roads and localized areas of bare ground. Most disturbed sites have recovered in the short term by effective mitigation of past projects, reforestation, and natural revegetation processes.

Currently, 38 acres or 0.9 percent of the soil in the Hazard Helicopter planning area is in a totally committed condition as a result of existing roads and recreation trails. This amount is well within the Forest Plan standard of 5.0 percent total soil resource commitment.

ENVIRONMENTAL EFFECTS

Soil productivity is the inherent capacity of the soil to support the growth of vegetation. Management activities directly affect soil properties linked to on-site soil productivity, and this is a common issue associated with forest management practices. The magnitude of potential effects is a function of the types of disturbance, the location of activities, and limitations of the various soils within the affected area. These factors were considered in the analysis to evaluate the effects of soil disturbance from timber harvest and associated activities. Assumptions used in the analysis are found in Appendix A of this document.

The proposed management activities include timber harvesting, road reconstruction, the construction of log landings, and various slash disposal and site preparation techniques. Specific activities are displayed in Table 2-1 of Chapter 2. This information may be used to compare alternatives for an indication of potential impacts on soil productivity. Road reconstruction (miles) and acres allocated to landings are the main activities that would cause physical disturbance and adverse effects on soil productivity. Although the types and locations of soil disturbance vary by alternative, the nature of the direct and indirect effects is similar for the action alternatives.

The actual effects of the proposed actions will depend on the extent of soil disturbance and the level of success in project design and implementation. Mitigation measures are described in Chapter 2 and Appendix H of this document. The potential effects common to the action alternatives include: detrimental disturbance, accelerated erosion, mass movements, loss of organic matter (nutrients), and total soil resource commitment.

The following section describes specific management practices and physical soil disturbances that can affect soil productivity. Additional information about the effects of management activities on soils can be found in the Forest Plan FEIS.

EFFECTS COMMON TO THE ACTION ALTERNATIVES

Helicopter logging systems will be used to harvest timber in all action alternatives. The extent of soil disturbance with this method is the least of all harvest systems. The only physical soil disturbance that normally occurs is caused by tree felling, which rarely exposes bare mineral soil to erosion. Unlike the effects of ground-based skidding operations, soil organic layers are not displaced or detrimentally disturbed during helicopter logging. Although timber harvest removes nutrients from the ecosystem, the proposed silvicultural treatments would leave adequate amounts of logging debris and large woody material (greater than 3 inches in diameter) to ensure long-term nutrient cycling on harvested sites. Therefore, it is not anticipated that this management practice would result in negative impacts on long-term soil productivity.

The primary impacts from helicopter harvesting are from roads needed to access landings. Roads represent a long-term commitment of the soil resource until their functions have been

served and sites are converted back to a productive capacity. The construction of new roads would not occur in any of the alternatives, but existing road segments would be reconstructed to improve the transportation system. The lack of road construction effectively minimizes the potential for direct and indirect effects from mass movements, accelerated erosion, and stream sedimentation.

Road reconstruction would displace soils with heavy equipment during reshaping, and some soil would be lost through accelerated erosion. Reconstruction of existing roads would have substantially less impacts than new construction. Research has shown that surface erosion is highest during the first year after disturbance, and accelerated erosion rates decline rapidly once exposed soil revegetates or becomes armored (Megahan, et al. 1972). Disturbed areas would be stabilized to reduce the potential of surface erosion during and following project implementation. The application of Best Management Practices (Appendix H) would minimize short-term impacts to meet Forest Plan standards.

The action alternatives include the construction of log landings along existing roads. The area of soil committed to landing sites would be the minimum necessary for yarding. Construction activities coupled with the use of landings cause detrimental disturbances that include soil displacement, accelerated erosion, compaction, and soil puddling. The interaction of these disturbances can have long-term effects on soil productivity until sites are adequately reclaimed. Reconstruction of any existing landings would have substantially less impacts than sites requiring new construction. Disturbed areas would be stabilized by Best Management Practices (Appendix H) that reduce surface erosion and minimize short-term impacts from these activities.

The action alternatives would use various combinations of slash disposal and site preparation techniques to reduce fuels and prepare sites for reforestation. Logging slash is an important source of organic matter that supplies sites with nutrients and reduces the potential of surface erosion. However, too much fine woody material on the ground may increase wildfire risk to an unacceptable level. Care must be taken during slash disposal activities to retain enough evenly distributed, large woody material (greater than 3 inches in diameter) to ensure long-term nutrient cycling on harvested sites. Research indicates that a minimum of 10 to 15 tons of large woody material per acre would maintain long-term soil productivity (Graham et al. 1991). The effects of these management practices on soil productivity depend on the amount of woody material and organic matter removed or retained from affected sites.

The lop and scatter method is commonly used where fuel accumulations would not increase the risk of wildfire to an unacceptable level. The rearrangement of logging slash helps maintain soil productivity by protecting the soil from erosion, controlling soil surface temperatures, and providing a long-term source of nutrients. This method of slash disposal is recommended on fragile sites (i.e., shallow soils, steep slopes) to provide surface protection for erosion control and microclimates for establishing vegetation. Therefore, this management practice is expected to result in beneficial effects on soil productivity.

Alternatives B and D would use jackpot burning to remove some of the fine woody material (less than 3 inches in diameter) by burning small concentrations of logging slash to reduce the risk of wildfire. This method would not concentrate enough fuels to cause intense burning and adverse effects on soils. Enough large woody material would remain on harvested sites for surface protection and long-term nutrient cycling. Burning the fine materials releases nutrients

and makes them available for new plant growth much more quickly than normal decay processes. Therefore, this management practice would increase available nutrients in localized areas that may benefit residual trees and other vegetation.

YUM (yarding unmerchantable material) may be used to reduce fuel accumulations in portions of some harvest units. Although this method removes organic matter (nutrients) from harvested sites, enough large woody material would remain for surface protection and long-term nutrient cycling. Adverse effects from this practice would occur on log landings where large concentrations of logging slash are burned. Intense burning can sterilize the soil or cause water repellent conditions and accelerated erosion. These adverse effects on soils, added cumulatively to other detrimental disturbances, could reduce soil productivity for many years.

Broadcast burning is commonly used in even-aged stands to prepare sites for reforestation, and this method is only proposed in Alternative C for one harvest unit. This method must be conducted under carefully controlled conditions to minimize the risk of intense burns that remove too much organic matter and cause adverse effects on soils. Prescribed burning on moist soils may provide for better distribution of on-site nutrients, and most of the large woody material would remain for surface protection and long-term nutrient cycling. Broadcast burns of light-to-moderate intensities can be highly beneficial on harvested sites.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

ALTERNATIVE A

This alternative does not propose any harvest activities in the planning area, and would not remove any acres of land from production. Total soil resource commitment would remain at the present level (0.9 percent of the planning area), which is within the Forest Plan standard of 5 percent. There would be no change in organic matter content of soils, and nutrient cycling processes would continue at naturally slow rates. The amount of down large woody material would remain low on harsh sites where soils have limited organic matter development.

The existing condition of past soil disturbances would continue to recover by natural processes over time. Surface erosion rates would not change appreciably unless catastrophic wildfires occur. No specific mitigation would be necessary for this alternative.

ALTERNATIVE B

Helicopter logging would not adversely impact the soil resource. The proposed harvest treatments would leave adequate amounts of large woody material on the ground. The effects on long-term soil productivity would be beneficial due to an increased supply of organic matter and accelerated nutrient cycling on harvested sites.

The rearrangement of logging slash by the lop and scatter method would also provide beneficial effects on sites that have low levels of woody material and soil organic matter.

Log landings would remove about ten acres of land from production. Total soil resource commitment would increase to 1.1 percent of the planning area, which is within the Forest Plan

standard of 5 percent. Detrimental disturbances, including intense burning of large slash piles, would have long-term negative effects on soil productivity until these sites are adequately reclaimed.

Landing construction and road reconstruction would cause direct impacts on 36 acres of land where heavy equipment is used. These impacts are not expected to cause indirect effects in downslope areas, such as loss or burial of productive surface layers. The application of Best Management Practices (Appendix H) would stabilize disturbed areas and minimize short-term impacts to meet Forest Plan standards.

ALTERNATIVE C

The effects of the proposed harvest treatments and lop-and-scatter slash disposal would be similar to those in Alternative B. Alternative C would treat less acres, but the location of most activities occur on the same soils and landtypes. Therefore, the same types of beneficial effects on soils can be expected, though the overall amount of these benefits would be less.

Broadcast burning is proposed for site preparation an a 33-acre clearcut unit located on basalt soils with a moderate erosion hazard. Prescribed burning would be conducted under moist soil conditions to minimize the risk of an intense burn that may cause adverse effects on soils. This management practice would increase available nutrients over most of the area, and this would benefit planted seedlings.

Log landings would remove about six acres of land from production. Total soil resource commitment would increase to 1.0 percent of the planning area, which is within the Forest Plan standard of 5 percent. Detrimental disturbances, including intense burning of large slash piles, would have long-term negative effects on soil productivity until these sites are reclaimed.

Landing construction and road reconstruction would cause direct impacts (i.e., soil displacement, accelerated erosion) on 11 acres of land where heavy equipment is used. These impacts are not expected to cause indirect effects in downslope areas. The application of Best Management Practices (Appendix H) would stabilize disturbed areas and minimize short-term impacts to meet Forest Plan standards.

ALTERNATIVE D

The effects of this alternative would be similar to those of Alternative B. This alternative would treat less acres in somewhat different areas, but the same types of timber management activities would occur on similar soils and landtypes. Therefore, the same types of beneficial effects on soils can be expected, though the location and overall amount of the benefits would differ.

Landing construction and road reconstruction would occur in the same locations as Alternative B, so there would be no difference in the types of physical soil disturbance or the area of soil committed to landing sites. Best Management Practices (Appendix H) would be applied to minimize the short-term impacts to meet Forest Plan standards.

CUMULATIVE EFFECTS

Cumulative effects on the soil resource are limited to the multiple actions that cause soil disturbance or manipulate vegetation within the same affected areas. The environmental analysis of management activities includes all past actions whose effects still exist, activities presently occurring, and future activities whose effects can be reasonably anticipated. The magnitude of cumulative effects is dependent upon the types of disturbance and the duration of activities on the various soils and landtypes in a given area.

The combined effects of past and present actions have been minimal in areas with limited access. The transportation system and other land uses have removed 38 acres of land from production or 0.9 percent of the planning area. Other areas of soil disturbance have recovered in the short-term by effective mitigation of past projects and/or natural revegetation processes. Under all action alternatives, the combined effects of the proposed activities would meet Forest Plan standards for the soil resource.

Future activities are assumed to occur as planned in the Forest Plan Activity Schedule. There are no outyear timber sales or other projects currently scheduled within the same planning area. The only foreseeable activities include recreation use, grazing, and future re-entries into various timber stands managed with shelterwood and uneven-aged silvicultural systems. Most of the cumulative effects are related to additional acreage that will be placed under timber management. Under the action alternatives, treated harvest units would be re-entered in approximately 15 to 20 years, and untreated stands this entry would be harvested in approximately 20 to 30 years. Future harvest activities are expected to be similar to the proposed activities of this project. Therefore, long-term commitments of the soil resource would remain within the Forest Plan standard, and Best Management Practices would be applied to effectively mitigate the short-term effects of soil disturbance.

The potential for future wildfires exists in all alternatives. However, the potential for long-term damage to soil productivity is minimized by the action alternatives that reduce fuel loadings with slash disposal methods. Alternatives B and D would use jackpot underburning to reduce fuel levels over a larger portion of the planning area.

The combined effects of timber harvest, construction and reconstruction activities, and grazing would cause cumulative increases in soil erosion. Grazing use is minimal due to the limited amount of suitable range in the planning area (see Range section in this chapter). Minor amounts of surface erosion would continue in localized areas where vegetation is removed by livestock, but these effects generally recover in the short-term by natural processes. Best Management Practices would mitigate project-related soil disturbances to prevent unacceptable soil loss. However, there is always some probability that erosion will create off-site cumulative effects to other resources. The effects on water quality and BOISED modeling results can be found in the Water section of this chapter.

Project-related mass movements typically occur on steep slopes where road construction causes slope loading, slope undercutting, or alteration of slope drainage. Since road construction generally does not occur in extensively managed areas, the cumulative actions of other management practices are not expected to create any mass movements.

Under all alternatives, the proposed actions combined with all past, present and reasonably-foreseeable land use needs would be within the Forest Plan standard for total soil resource commitment. Careful planning and design of projects would continue to maintain low percentages of total soil resource commitment to meet the Forest Plan desired future condition.

SUMMARY

All past, present and reasonably foreseeable activities meet Forest Plan standards and desired future condition. Best Management Practices (Appendix H) would be applied on all project-related soil disturbances to minimize cumulative effects and maintain long-term soil productivity. The short-term and long-term beneficial effects of nutrient cycling would be accelerated in those areas that have received some degree of timber harvest.

FOREST PLAN CONSISTENCY

All action alternatives would increase the extent of soil disturbance within the planning area, but only minor amounts would actually qualify as detrimental disturbance. The short-term (less than 5 years) impacts from timber management activities would be within Forest Plan standards if management requirements and appropriate Best Management Practices are properly carried out during and following project implementation.

All action alternatives would increase the area of total soil resource commitment within the planning area, but the Forest Plan standard would not be exceeded by any of the alternatives. The area of soil committed to log landings or other specific uses would be limited to the minimum necessary for management activities.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

The action alternatives are not expected to create any project-related mass movements that would cause irreversible damage to long-term soil productivity. Careful planning and Best Management Practices will be used to prevent mass movements and unacceptable soil loss.

The action alternatives would increase the acres of total soil resource commitment where land is used for log landings. These land uses are considered irretrievable commitments of the soil resource until their functions have been served and sites are returned to a productive capacity.


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Figure 3-1. Affected Areas for Water

Water

Issue: The effects of the proposed timber sale on water quality.

Indicator: Percent over natural sedimentation

Issue: The effects of the proposed timber sale on water yield and timing of peak runoff.

Indicator: Percent of subwatershed harvested

FOREST PLAN DIRECTION

Manage water resources at levels designed to meet management objectives for Forest watersheds. Monitor management activities to determine if practices being implemented are meeting water quality management objectives, including State and Federal laws.

DESIRED FUTURE CONDITION

The Desired Future Condition for water quality is to meet Idaho State standards (Forest Plan, page IV-70). In addition, all identified watershed improvement projects are to be completed.

AFFECTED AREA

Specified subwatersheds will form the boundaries of affected areas for the Water resources. These delineations include both on- and off-forest areas. Within the subwatersheds, stream segments may be directly, indirectly, or cumulatively affected (Figure 3-1).

The purpose of a subwatershed analysis approach is to better detect effects within larger individual drainages of a watershed. The severity of effects from management activities might otherwise be diluted due to greater land areas being involved. In addition, analysis on a subwatershed basis better reflects cumulative impacts to a critical reach, rather than the impacts from the planning area alone. The analysis is limited by the size of the subwatersheds and the management activities occurring within them.

AFFECTED ENVIRONMENT

The affected area of the proposed Hazard Helicopter timber sale has been impacted by past management activities. The degree of impact varies between subwatersheds. The affected area is comprised of two subwatersheds amounting to approximately 18,394 acres.

The affected areas are typified by medium to coarse-textured soils, derived from border zone granitics, having rapid infiltration rates. They readily receive and transmit water to streams as subsurface flow. The exception would be areas of shallow soils with surface rock, rock outcrops, or the finer-textured basalt soils that occur in the northern portion of the planning area.

Generally, the planning area contains first- through fifth-order streams. These systems are associated with steep gradients, which enable rapid and efficient transportation of sediment.

This effective mechanism can exacerbate impacts to beneficial uses in lower gradient sections downstream, if water quality is sufficiently degraded.

WATER QUALITY

Water quality consists of various physical, chemical and biological parameters that may affect designated beneficial uses. The parameter of most concern is sediment. Accelerated sediment production has the potential to affect fish habitat and other beneficial uses. Sediment production is affected most by road construction and use, and to a lesser extent by silvicultural activities and fire. Sediment is considered a non-point source pollutant and is regulated under federal and state water quality provisions.

An estimate of the existing sediment production was made using the BOISED sediment model. The program is a predictive model used to aid in assessing cumulative sediment yields from road construction and use, silvicultural activities, and fire and suppression tactics in small forest watersheds. Five-year annual averages are used to reduce inherent errors in the model due to the complexities of watershed processes. BOISED does not consider impacts to water quality from livestock grazing, mining, or ORV use. Information from the riparian inventory indicates that mining and ORV use are not currently impacting water quality in the planning area. Grazing, however, has reduced the amount of riparian vegetation on between 1 and 5 acres along Bascom Creek. More specific information regarding these impacts may be found in the Riparian Areas section.

There has been no systematic monitoring of water quality that would characterize streams within the Hazard Helicopter planning area. The nearest USGS national network stations are on the Salmon River at Whitebird, and on the Little Salmon River at Riggins.

TIMING AND YIELD

Timber harvest increases the overall total water yield of a watershed. The increase is proportional to the percentage of watershed harvested. To evaluate the existing condition of the planning areas, the ECA (Equivalent Clearcut Area) method, as described in Forest Hydrology II (1974), was used. The analysis was completed for both on- and off-Forest areas, with the affected areas being the same as the ones used for the BOISED analysis.

Hazard Helicopter Planning Area

The Hazard Helicopter planning area has received limited amounts of historical management activities, including road construction and timber harvest. For the purpose of this analysis the affected area has been divided into two subwatersheds: Hazard Creek, and Lower Hard Creek. Additionally, each subwatershed has an on-Forest and off-Forest component. Both Hazard and Hard Creeks are tributaries to the Little Salmon River and flow through National Forest, state, BLM, and private lands. The off-Forest portions of both watersheds have received a higher intensity of road construction and timber harvest than the on-Forest portions.

On-Forest, Lower Hard Creek is 4,287 acres in size and contains approximately 3.3 miles of closed roads and 49 acres of timber harvest. Hazard Creek is 11,503 acres in size and contains approximately 1.6 miles of closed roads, 4.1 miles of open roads that receive light use, and 117 acres of timber harvest.

Off-Forest, Lower Hard Creek is 1,121 acres in size and contains approximately 8.2 miles of closed roads, 1.1 miles of open road, and 125 acres of timber harvest. Hazard Creek is 1,483 acres in size and contains approximately 7.9 miles of open roads receiving light use, and 244 acres of timber harvest.

Table 3-3. Percent of Existing Sediment Production Over Natural for the Hazard Creek and Lower Hard Creek Subwatersheds

Subwatershed	Percent Over Natural On Forest	Percent Over Natural Off Forest
Lower Hard Creek	0.3	12.8
Hazard Creek	1.1	16.7

Table 3-4. Existing Percent of Subwatersheds Harvested

	Percent of Subwatersheds Harvested	
Subwatershed	On Forest	Off Forest
Hard Creek	0.7	5.2
Hazard Creek	1.4	8.6

Due to the natural variability in watershed processes, the BOISED model is not accurate in this range of modeled output, however these findings are consistent with instream monitoring accomplished in Lower Hard and Hazard Creek. Refer to the Fish section for more information on instream monitoring.

WATER USES

Water rights and uses within and near the planning area vary. Beneficial uses were identified within and near the planning area by reviewing state water rights files. Some uses listed may never have been developed, and some recent filings may not be recorded.

The State of Idaho has implemented an Antidegredation Policy as required by the Clean Water Act. Under this policy, as outlined in Idaho Executive Order 88-23, "Stream Segments of Concern," as well as designated beneficial uses, have been designated and recognized as needing protection.

Hazard Helicopter Planning Area

Hard and Hazard Creeks are Stream Segments of Concern. In the spring of 1991, Idaho Department of Lands approved a report from the Local Working Committee finalizing Water Quality Objectives and Site-Specific Best Management Practices for these streams. These are summarized in Appendix H in this EIS and are on file in the Payette National Forest

Supervisor's Office.

The water quality objectives set for Hard and Hazard Creeks are maintenance of beneficial uses at existing levels, and improvement of certain portions of the drainage where land use activities may be impacting water quality.

Current areas where land use activities are impacting water quality were identified as sections of Forest Road 250 and the road leading to Forest Trail 317 (personal communication with John Lillihaug, Idaho Department of Lands). Both these sites occur off-forest.

The beneficial uses for Hard and Hazard Creeks were identified by the Local Working Committee. For Hazard Creek they are: agriculture water supply, cold water biota, salmonid spawning, and secondary contact recreation. The use for Hard Creek is hydropower.

ENVIRONMENTAL EFFECTS

Direct effects to the watershed resources are those that may immediately affect water quality and quantity, such as sediment caused by installing a culvert at a stream crossing. Indirect effects are those that occur later in time or farther in distance from the direct effects--for example, when the sediment described above travels downstream and affects fish habitat spawning grounds a mile from where the culvert was installed.

WATER QUALITY

The water quality parameter of most concern is sediment. Road reconstruction and landing construction may remove organic material, exposing mineral soil to rainfall impact, running water, wind, and other erosive forces. Soil particles may be detached and delivered to a stream as sediment with the potential of detrimentally impacting beneficial uses. The degree of soil detachment is related both to the intensity of the erosive force and the inherent detachability of the soil. Soils derived from granitic parent material generally lack cohesion and are, therefor, more susceptible to detachment than soils derived from basalt parent material.

Road reconstruction and log landing construction are the largest potential sources of accelerated sediment produced by the sale alternatives. The magnitude of sediment from these activities varies greatly, depending on topography, climatic conditions, and the extent and proximity of disturbance to water.

The Hazard and Lower Hard Creek drainages both have segments of roads that are located on lower slope positions. These roads represent a large portion of the accelerated erosion currently reaching the streams. To varying degrees, the action alternatives would reconstruct these roads. In addition, mitigation measures would be applied to portions of the roads that have been identified as chronic sediment producers (see Appendix H in this EIS for specific mitigation measures). Due to soil exposure and movement, reconstruction of the roads would increase sediment production over the short term. However, the reconstruction measures, combined with applied mitigation, should reduce current sediment production within 1 to 2 years of implementation.

An estimate of management generated accelerated sediment, for each alternative was made using the BOISED sediment model. Estimations of sedimentation from timber harvest, road reconstruction, and log landing construction, as well as sediment reductions from mitigation, are calculated for each alternative. Alternatives may then be compared on the merits of relative sedimentation impacts to subwatersheds. Refer to BOISED User's Guide and Program Documentation and Payette National Forest FEIS, Appendix B, pages V-28 to V-33 for a more complete discussion of the use and limitations of the BOISED model.

TIMING AND YIELD

The removal of trees through timber harvest (specifically large clearcuts), and to a lesser degree, amount and location of roads, and burned areas may increase overall water yield of a watershed and can change the timing of peak runoff of a stream. In addition compaction of the ground decreases the percolation of water into the ground, increasing surface runoff which is delivered to the stream earlier. Road cut slopes can intercept subsurface flow changing it to surface runoff, allowing that portion of water to reach a stream faster. Increases in water yield, particularly changes to peak runoff, can increase bank erosion, thereby destabilizing the dynamic equilibrium of the system. The end result could be detrimental impacts to beneficial uses. Research has shown that the amount of water yield increase is proportional to the percent of Equivalent Clearcut Area within a subwatershed.

The effects of timber management activities on peak flow are more variable and less well understood. Factors such as harvest-unit opening size, prevailing wind patterns, and aspect affect the melt rates of snow. In addition, the water-holding capacity of the soil affects peak flows. Generally, the planning area contains medium-to-coarse textured soils with limited water-holding capacity. The majority of water held on-site is contained in the organic rich upper layer of soil and large organic debris. Management direction to retain 10 to 15 tons per acre of large organic (woody) debris would help retain moisture in the areas having poor water-holding capacity.

WATER USES

Of the identified beneficial uses, cold water biota and salmonid spawning have state water quality criteria. The criteria are: dissolved oxygen exceeding 6 milligrams per liter or 90 percent saturation, whichever is greater; pH of 6.5 to 9.0; temperature of 13 degrees Celsius, or less, with a maximum daily average no greater than 9 degrees during periods of spawning if natural temperatures allow. Results of temperature readings may be found in the Fish section.

No specific state water quality criteria exists for sediment produced from non-point sources, such as timber harvest and road construction. In the absence of specific sediment criteria, waters of the state must not contain "quantities which impair beneficial uses. Determination of impairment shall be based on water quality monitoring and surveillance." Under this feedback loop concept, compliance of state standards is based on whether or not the proposed activities:

- Comply with approved and/or specialized BMPs (Best Management Practices),
- Provide a monitoring plan which determines implementation and the effectiveness of BMPs in protecting the identified beneficial uses, and
- Provide a process for modifying ineffective BMPs, as determined from monitoring.

More information about State standard compliance for all alternatives may be found in Appendix H and Chapter 2, Mitigation Measures and Management Requirements.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

WATER QUALITY, TIMING AND YIELD

Alternative A

Alternative A would not harvest or reconstruct any road segments. Nor would it implement any of the road reconstruction mitigation aimed at reducing sediment from identified areas. Mitigations in these areas would be completed if another land owner used these access routes to harvest timber.

Alternative B

Alternative B harvest approximately 514 acres in the Hazard Creek subwatershed and 322 acres in the Hard Creek subwatershed utilizing shelterwood and uneven-aged prescriptions. No new miles of road would be constructed, 6.5 miles of road would be reconstructed. Estimated sediment output from activities is 1.5 percent over natural, or 0.4 percent over existing condition, for the Hazard Creek subwatershed. For the Hard Creek subwatershed estimated sediment output from activities is 0.9 percent over natural, or 0.6 percent over existing condition.

Alternative C

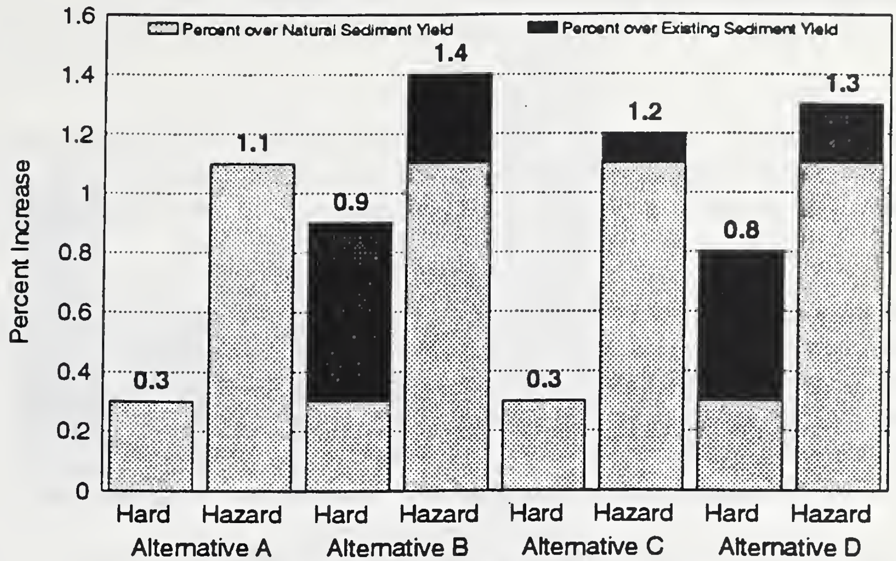
Alternative C harvests approximately 185 acres in the Hazard Creek subwatershed, using clearcut and shelterwood prescriptions and helicopter yarding. No new miles of road would be constructed, 1.2 miles of existing roads would be reconstructed. Estimated sediment output from activity is 1.3 percent over natural, or 0.2 percent over existing condition.

Alternative D

Alternative D harvests approximately 315 acres in the Hazard Creek subwatershed and 240 acres in the Hard Creek subwatershed, using shelterwood and uneven-aged prescriptions. No new miles of road would be constructed, 6.5 miles of road would be reconstructed. Estimated sediment output from activities is 1.4 percent over natural, or 0.3 percent over existing condition, for the Hazard Creek subwatershed. For the Hard Creek subwatershed estimated sediment output from activities is 0.7 percent over natural, or 0.4 percent over existing condition.

Figure 3-2 displays modeled increases in sediment yield over natural and over existing levels.

Figure 3-2. Increased Sediment Yield Over Natural and Over Existing for Hard Creek and Lower Hazard Creek Subwatersheds by Alternative



Alternative A represents existing impacts
Alternatives B, C, and D represent existing and proposed activity impacts

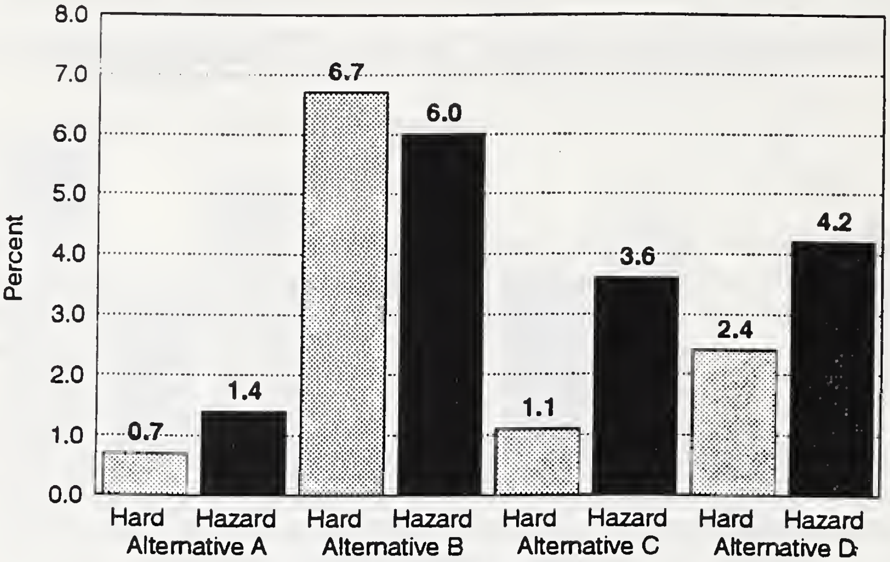
Due to the natural variability in watershed processes, the BOISED model is not accurate in this range of modeled output, however the outputs do demonstrate that: 1) there has been limited management activities in these subwatersheds, and 2) the proposals do not construct any new road.

TIMING AND YIELD

Studies pertaining to water yield in snow-dominated precipitation regimes demonstrate that overall water yield increases are inconsequential to streambank stability where less than about 30 percent of the watershed is harvested. Harvest of more than around 30 percent of a watershed may detrimentally impact beneficial uses through changes in stream morphology caused by increased water yield and changes in the timing of peak flows. No alternative would cause any subwatershed to have 30 percent of its area harvested. In large part this is due to the extensive management direction for most of this area.

Figure 3-3 displays modeled percent of subwatershed harvested.

Figure 3-3. Percent of Subwatershed Harvested by Alternative



Alternative A represents existing harvest
Alternatives B, C, and D represent existing harvest plus proposed harvest

WATER USES

Water diverted directly out of streams running through the planning area may be turbid during road work, snow melt, or thunderstorms during the life of the project. No permanent water diversions would result from any of the alternatives. Water could be used during road work for dust abatement. Management requirements for this activity would reduce the risk of additional sedimentation.

Any changes in accelerated sediment or water yield should not substantially affect downstream water use. It is expected that base or low flows, and water yield in general, will be unchanged or slightly increased. Results of water quality and quantity analysis indicate that water uses should not be negatively impacted.

Channel stability (Pfankuch, 1974) for both Hard and Hazard Creeks was rated as excellent due to extensive channel armoring and densely vegetated banks. Because of the limited management activities, the proposed road mitigation, the Site Specific BMPs, and the high bank stability rating, any alternative would have negligible direct and indirect impacts to Hard and Hazard Creeks, or any of their tributaries, from accelerated sediment produced by road reconstruction or timber harvest.

CUMULATIVE EFFECTS

Cumulative effects are the effects of the alternatives combined with conditions in the subwatersheds from past, present, and any reasonably foreseeable future actions. Cumulative effects from timber harvest activities over time may increase streamflows or introduce accelerated sediment that can alter the dynamic equilibrium of a stream system to the extent that beneficial uses are impacted.

Model outputs from both BOISED and the ECA will be used to assess cumulative effects. Often, reasonably foreseeable future actions have not been developed to the level required for analysis using either model. In these cases the effects of future actions must be handled in a narrative fashion.

The Payette National Forest and Bureau of Land Management have no reasonably foreseeable planned activities within the affected area. The BLM does have a helicopter sale planned the same year as this proposal, which is included in the BOISED analysis. Although activities on private land are difficult to predict over the long term, there are no known activities planned on private land for the foreseeable future. Uneven-aged units may be entered around every twenty years. Impacts for those entries would be similar to those described for this proposal.

Because of the area's rugged topography and limited access, activities such as grazing, mining, and ORV use should remain minimal in extent and have negligible cumulative effects on water quality and timing and yield.

Table 3-5 displays the combination of past, present, and proposed actions on both percent over natural sedimentation and percent of subwatersheds harvested.

Table 3-5. Cumulative Effects of the Alternatives on Sediment Production and Percent of Subwatersheds Harvested

	LOWER HARD CREEK		HAZARD CREEK	
ALTERNATIVE	Percent Sediment Produced	Percent of Subwatersheds Harvested	Percent Sediment Produced	Percent of Subwatersheds Harvested
A	0.3	1.08	1.1	2.27
B	0.9	6.00	1.4	6.73
C	0.3	3.61	1.2	1.08
D	0.8	4.15	1.3	2.44

FOREST PLAN CONSISTENCY

All alternatives, coupled with the management requirements, BMPs, SSBMPs, and monitoring detailed in this document, would be consistent with the Forest Plan.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

No alternative would result in irreversible or irretrievable commitments of the water resource.

The Biological Environment

Plants, animals, and natural processes comprise the biological environment. Together with the physical environment, they form a collective, living organism called an ecosystem. The plants depend on the air, the soil, and water to grow into intricate habitats like riparian areas, old-growth forests, and open meadows--all of them different, yet all of them connected and merging at the edges into many other habitats. These habitats are, in turn, used by different animals--both wild and domestic--for foraging, reproduction, and survival. Natural processes like fire, succession, and disease alter these habitats over time, and the plants and animals adapt and evolve in the ever-changing ecosystem.

Riparian Areas

Riparian areas were not raised as an explicit issue for this sale. However, the condition of riparian areas is intricately connected to the condition of other issues, such as water quality, timing and yield, fish habitat, and wildlife habitat. Therefore, this section describes the existing riparian area conditions in the planning area and the effects that proposed activities may have on those conditions. This section also describes effects on wetlands and floodplains, which is required by Executive Orders #11988 and #11990.

FOREST PLAN DIRECTION

Consider the effects on riparian areas when proposing, planning, and implementing all resource management projects. This analysis should meet the objectives of Executive Orders #11988 and #11990. Preferential consideration is given to riparian-dependent resources over other resources when conflict occurs.

DESIRED FUTURE CONDITION

The Desired Future Condition of all riparian areas is improvement of degraded areas where possible, and protection of areas presently in good condition (Forest Plan, pages IV-91 and IV-92).

AFFECTED AREA

The timber sale planning area serves as the affected area for the riparian resource (Figure 2-1).

AFFECTED ENVIRONMENT

Riparian areas are management zones that combine the ecologic concerns of riparian ecosystems with the hydrologic concerns of floodplains and streamside slopes. They include all aquatic and riparian ecosystems and associated floodplains. Usually, riparian areas are associated with perennial streams, springs and seeps, wet meadows and bogs.

Riparian areas are recognized, both in the Forest Plan and in this EIS, because of their effects on overall water quality. Riparian condition influences water quality and stream conditions. Riparian areas play an important role in maintaining riparian-dependent resources (fish, water, wildlife) whose numbers are disproportionately high to the area of land they occupy. Riparian areas are also important in buffering fluctuations in water yield and sedimentation, thereby maintaining stability in watershed condition. Riparian areas are also important due to the legal responsibilities of complying with Executive Order #11990, which requires protection of wetlands.

A Level II riparian inventory that fully meets Forest Plan standards was completed for the Hazard Helicopter planning area. The inventory followed the general format of the Region 4 Riparian Inventory procedure. The inventory characterized riparian areas using channel morphological features such as substrate and width and depth; identified vegetative community types; determined the existing ecological condition and trends; and noted problem areas. The

inventory report is on file in the Supervisors Office in McCall, Idaho. The results are summarized below by stream.

The overall condition of the riparian areas within the Hazard Helicopter planning area is good, according to the inventory for the area. Perennial streams generally have a boulder substrate and densely vegetated banks. On-site beneficial uses associated with these streams include cold water biota, secondary recreation, salmonid spawning, and agricultural uses.

HAZARD CREEK

The planning area includes about 1.3 miles of Hazard Creek. During the survey, the creek averaged 30 to 40 feet for water width, 1 to 2 feet in depth, a 3 percent gradient, and had a large boulder substrate. Channel stability rated excellent due to extensive armoring and densely vegetated banks. The riparian vegetation features Engelmann spruce, grand fir, and Douglas-fir in the overstory, and birch, alder, dogwood, and maple in the midstory. The riparian width ranged from 20 to 100 feet. The overall ecological condition of the riparian area was good, with 75 percent at a potential natural community. Shrubs were vigorous and resprouting. The vegetative community indicated the existing condition is stable, and the trend is toward a potential natural community.

HYATT CREEK

The planning area includes about .25 mile of Hyatt Creek. During the survey, the creek averaged 3.5 to 5 feet for water width, 4 to 6 inches in depth, a 45 percent gradient, and had a large boulder substrate. Channel stability rated excellent due to extensive armoring and densely vegetated banks. Engelmann spruce, grand fir, and Douglas-fir dominated the overstory vegetation, while birch, alder, dogwood, and maple were found in the midstory. The riparian width ranged from 20 to 100 feet. The overall ecological condition of the riparian area was good, with 75 percent at a potential natural community. Shrubs were vigorous and resprouting. The vegetative community indicated the existing condition is stable, and the trend is toward a potential natural community.

HARD CREEK

The planning area includes about 1.8 miles of Hard Creek. During the survey, the creek averaged 35 to 40 feet for water width, 8 to 10 inches in depth, a 2 percent gradient, and had a large cobble substrate. Channel stability rated excellent due to extensive armoring and densely vegetated banks. Engelmann spruce, grand fir, and Douglas-fir dominated the overstory vegetation, while alder, dogwood, and mountain ash were found in the midstory. Twin flower and western goldthread dominated the understory on the low riparian benches. The riparian width ranged from 10 to 80 feet. The overall ecological condition of the riparian area rated good to fair, with 55 to 75 percent at a potential natural community. Shrubs were vigorous and resprouting. The vegetative community indicated the existing condition is stable, and the trend is toward a potential natural community, except in those areas that are impacted by sheep trailing. These areas will most likely remain in a early to mid-seral condition and are limited in extent.

BASCOM CREEK

The planning area includes about 0.7 mile of Bascom Creek. During the survey, the creek was 8 feet in width, 6 inches in depth, had a 15 percent gradient and a large cobble substrate. Channel stability rated good due to extensive armoring and vegetated banks; however, the vegetation is limited due to livestock grazing. Engelmann spruce, grand fir, and Douglas-fir dominated the overstory vegetation, while birch, alder, dogwood, and maple were found in the midstory. The riparian width ranged from 10 to 80 feet. The overall ecological condition of the riparian area rated good to fair, with 55 to 75 percent at a potential natural community. Shrubs were vigorous and resprouting. The vegetative community indicated the existing condition is stable, and the trend is toward a potential natural community, except in those areas that are impacted by sheep trailing. These areas are limited in extent and will most likely remain in a early to mid-seral condition.

ENVIRONMENTAL EFFECTS

This sale directly and indirectly affect portions of Hazard, Hyatt, Hard, and Bascom Creeks, as well as several unnamed intermittent streams and ephemeral draws. A close relationship exists between timber harvest, road construction, livestock use, and riparian condition.

The main impact from management activities is the loss of riparian vegetation. This loss is often associated with a decrease in bank stability due to reduced soil cohesion, and a decrease in sediment storage capacity due to reduced availability of LOD (large organic debris). Loss of vegetation can also directly affect stream water temperature, which indirectly affects fish habitat. All action alternatives pose some risk for loss of LOD in riparian areas through timber harvest. However, because the only logging system would be low-impact helicopter yarding, the risk would be very low if SSBMPs are properly implemented (see Appendix H).

Sedimentation from road and stream-crossing construction can also have impacts on riparian areas. However, no roads or stream-crossings would be built under any alternative for this proposed project, so no sedimentation would occur from these activities.

Other impacts from timber harvest and road reconstruction would be greatly reduced or eliminated through designation of buffer zones between areas being managed and streams. Refer to Appendix H for a complete list of SSBMPs that would reduce impacts to the riparian resource.

Minor impacts from sheep trailing would remain unchanged under all alternatives.

FLOODPLAINS AND WETLANDS

No wetland or floodplain would be filled because there is no road construction planned with any alternative. Therefore, the intent of Executive Orders #11988 and #11990 would be met.

Timber harvest in areas of high water tables may result in induced wetlands; however, they would be transitional in nature until the site returns to a forested nature. The riparian inventory did not describe any areas having high water tables within the planning area.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

ALTERNATIVE A

Alternative A would not harvest any timber or build any roads. Natural riparian processes would continue.

ALTERNATIVE B

Alternative B would have about 0.2 mile of harvest unit boundary near Hyatt Creek, 4.4 miles of harvest unit boundary near Hazard Creek, 1.1 mile of harvest unit boundary near Hard Creek, and 1.1 mile of harvest unit boundary near Bascom Creek. The timber harvest in this alternative poses a very low risk for loss of LOD in the riparian areas and sedimentation to the streams listed above.

ALTERNATIVE C

Alternative C would have about 0.2 miles of harvest unit boundary near Hyatt Creek, and 4.4 miles of boundary near Hazard Creek. No harvest would occur in Hard and Bascom Creeks. Timber harvest in this alternative poses a very low risk for LOD loss in the riparian areas and sedimentation in Hyatt and Hazard Creeks.

ALTERNATIVE D

Alternative D would have about 2.7 miles of harvest unit boundary near Hazard Creek, 1.1 mile of boundary near Hard Creek, and 1.1 mile of boundary near Bascom Creek. Timber harvest in this alternative poses a very low risk for loss of LOD in the riparian areas and sedimentation in Hazard, Hard, and Bascom Creeks.

CUMULATIVE EFFECTS

Cumulative effects are the effects of the alternatives combined with effects in the planning area from past, present, and any reasonably foreseeable actions. Cumulative effects from timber harvest activities over time may contribute to a loss of riparian habitat through direct removal of riparian vegetation. No proposed alternative includes road construction, which has the greatest potential to impact the resource. In addition, the majority of the planning area lies within Management Area 10, which has Forest Plan direction to manage timber extensively by use of helicopter in undeveloped areas.

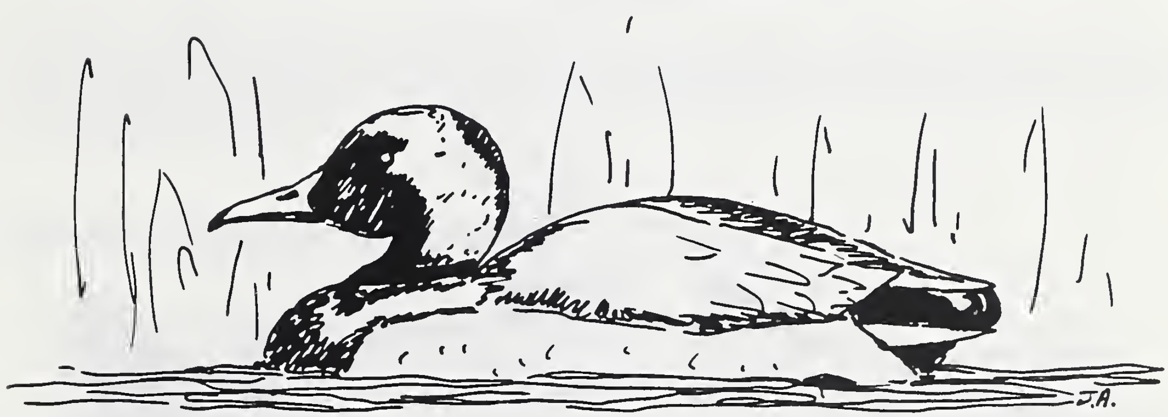
Of all the alternatives, Alternative D has the largest potential for cumulative effects because the majority of harvest would be by uneven-age methods where re-entry would be approximately every twenty years. However, even these impacts would be minor.

FOREST PLAN CONSISTENCY

All alternatives, combined with the management requirements, BMPs, SSBMPs, and monitoring detailed in this document, would be consistent with the Forest Plan. The objectives of Executive Orders #11988 and #11990 would be met, and riparian areas presently in good condition would be protected.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

No alternative would result in irreversible or irretrievable commitments of the riparian resource.

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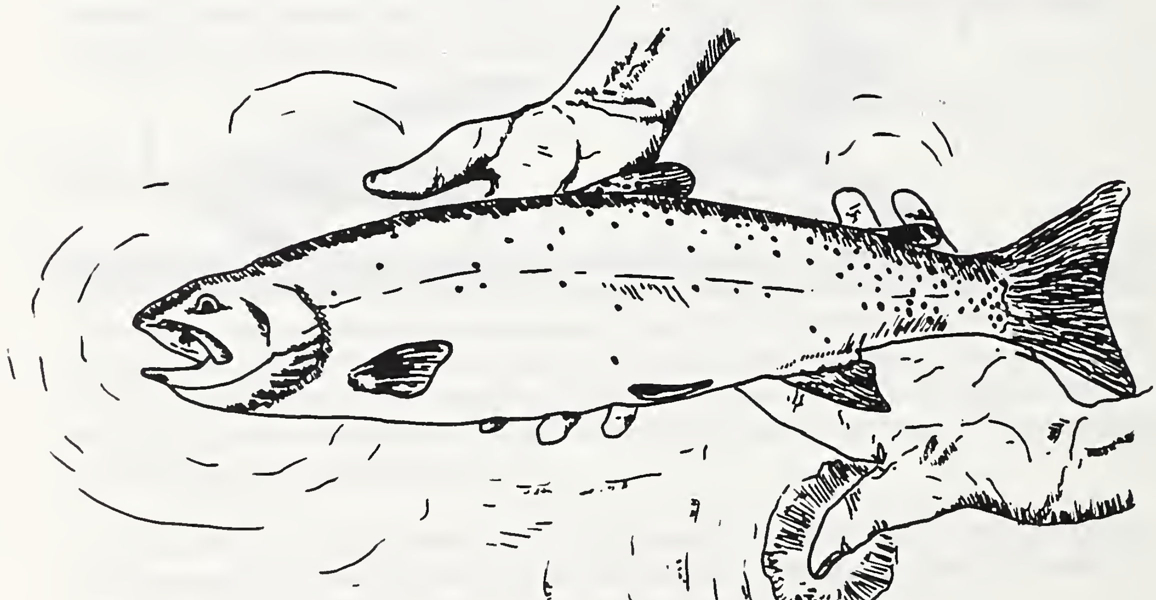


Fish Habitat

ISSUE: The effects of the proposed timber sale on fish habitat.

Indicators:
- **Percent over natural sedimentation**
- **Miles of road constructed or reconstructed**
- **Number of new stream crossings constructed**
- **Proximity of harvest to perennial waters**
- **Risk of toxic spills**

FOREST PLAN DIRECTION

Manage drainages containing anadromous fish habitat to improve upon overall existing habitat capability and maintain existing, overall habitat potential for resident fish (page IV-37). In Hazard and Hard Creek drainages, impacts of man's actions are readily perceptible to many professional observers, but not measurable using commonly applied technologies. This is crudely equivalent to maintaining 90 percent of the existing habitat condition.

DESIRED FUTURE CONDITION

The present overall condition of fish habitat capability in drainages with salmon and steelhead will be improved by limiting sediment production and investing in fish habitat and watershed improvement and erosion control on roads (Forest Plan, page IV-41).

AFFECTED AREAS

For the Hazard Helicopter sale, directly affected areas include Hazard and Hard Creeks within and below the proposed activity, downstream to the confluence with the Little Salmon River. The area which may be indirectly affected is each entire stream drainage from their mouths to headwaters. The area cumulatively affected is the Little Salmon River drainage.

AFFECTED ENVIRONMENT

Fish habitat for five Forest Plan management indicator species, two sensitive species, and one threatened species exists in watersheds potentially affected by the Hazard Helicopter timber sale. Essential habitat elements--including substrate, water quality, water quantity, temperature, cover/shelter, food, riparian vegetation, and space--may be directly, indirectly, or cumulatively impacted by the proposed activities.

Management indicator species of fish within the analysis area include Snake River spring/summer chinook salmon and cutthroat, redband, and steelhead, and bull trouts (Forest Plan II-36). These species are native or endemic to the area and represent species sensitive to habitat alteration. They have been, are, or have the potential to be socially and economically important. All of these species, except redband trout, are Forest Service designated sensitive species. The Snake River spring/summer stock of chinook salmon is a threatened species protected under the Endangered Species Act, administered by the NMFS (National Marine Fisheries Service). NMFS has proposed designating critical habitat for this chinook stock that includes all waters and adjacent riparian zones of the Salmon River sub-basin (December 2, 1992).

The final critical habitat designation is published within one year of the proposed rule. Critical habitat is defined as the specific areas within the geographical area occupied by the species on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection.

The Forest Service is required to prepare a biological assessment to determine whether the chinook salmon are likely to be adversely affected by the preferred alternative. NMFS reviews the assessment for adverse affects on the species and critical habitat, as part of its consultation process with the Forest Service. The Responsible Official also considers the assessment in determining the selected alternative in the Record of Decision for the Final EIS. This biological assessment will be mailed out to known, interested parties and will be available in the planning records when the Record of Decision is published.

CURRENT SITUATION

The two principal streams potentially affected by this sale are Hard and Hazard Creeks.

Hard Creek, a tributary to Hazard Creek approximately two miles east of the Little Salmon River confluence, contains resident and anadromous fish habitat. One-half mile above its confluence with Hazard Creek, three falls of 4, 12, and 8 feet in height form a barrier to upstream migrating fish. Approximately 800 square yards of suitable steelhead spawning area, 1000 square yards of suitable chinook spawning area, and one acre of anadromous rearing habitat occur below these falls. About 1/4 mile downstream from the confluence of Hard Creek and Corral Creek is a 20-foot waterfall which prevents all upstream fish passage.

Hazard Creek, a Class I stream with a subwatershed size of 27,867 acres, is a moderate to steep gradient (4 to 6 percent) stream with a boulder-dominated substrate, and few low-gradient pools. The stream is characterized by a long, narrow valley with a well-developed, parallel drainage system. One mile above the confluence with Hard Creek and three miles above the confluence with the Little Salmon River, a 100-foot natural waterfall prevents all upstream fish migration.

Historically, chinook salmon used habitat throughout the Little Salmon River and it's tributaries. However, road construction altered fish passage in the early 1900s, preventing access to the upper valley. Chinook salmon and steelhead trout now occupy the mainstem river and major tributaries, including Hard and Hazard Creeks, downstream from a complete migration barrier in the vicinity of Round Valley Creek.

The Idaho Fish and Game Department manages the Little Salmon river primarily as a hatchery system and occasionally plants eggs, fry, and adult salmon from the Rapid River fish hatchery into the upper drainage. No systematic spawning inventory for chinook salmon occurs within the Little Salmon river drainage, except for Rapid River. Yellowstone Lake type cutthroat trout, most likely of hatchery origin, occur in the upper Hazard Creek drainage.

The predominant land uses within the Little Salmon River drainage are timber and range management. Most of the area has experienced some degree of timber harvesting, and range allotments cover the entire area. Hazard and Hard Creek drainages have received moderate levels of land-disturbing activity. The general erodibility of the drainages is moderate to low. However, both drainages contain some inclusions of erodible soils sensitive to disturbance,

especially road use.

In the Hazard Creek drainage, there is about 8.5 miles of road (Tepee Springs Road). Of this, 1.4 miles are on BLM, 3.0 miles are on private land, 1.5 miles are on State land, and 2.6 miles are on Forest land. The first 0.75 mile of this road closely parallels Hazard Creek within 200 feet, and active erosion is reaching the creek. Beyond this, the road leaves the lower slopes of Hazard Creek and is principally located on upper slopes. Substrate monitoring by BLM in 1992 indicated water quality impacts associated with sediment, principally elevated cobble embeddedness values (30 and 33 percent).

In the Hard Creek drainage, there is about 3.3 miles of road; the first 1.0 mile on BLM land, the next 0.4 mile on private land, and then 1.9 miles on Forest land. The BLM section has been highly erosive, and a short, eroding section was graveled in 1992. The road's distance from the creek varies from 200 to 300 feet, and erosion reaching the stream is evident. The BLM road section crosses six unnamed tributaries with culverts, most of which are plugged or washed out. Substrate monitoring in 1992 found high cobble embeddedness (38 percent) and low surface fines (4.6 percent).

The BLM has currently proposed mitigations for road use in the lower portions of both drainages that would result in a "not likely to adversely affect" determination, and insignificant and undetectable impacts to chinook salmon (BLM 1993).

Road Densities

Road density, expressed as miles of road per square mile of watershed area, provides an overall index of the potential for road erosion to affect watershed function. Because slope can greatly influence the interception and redistribution of groundwater, separate road density risk indices are used for watersheds with relief greater or less than 30 percent. For watersheds with relief greater than 30 percent, including Hazard and Hard Creeks, low risk of cumulative erosion effects exist when road densities are less that 2 miles per square mile. Hazard Creek watershed road density is 0.7 miles per square mile, while Hard Creek watershed density is 1.2 miles per square mile.

Percent of Watershed in Stands under 30 Years of Age

Young stands, resulting from harvest and reforestation or natural processes, can indicate potential increases in watershed runoff and changes in the timing of that runoff. To what degree watersheds may be affected depends on how much timber is in an equivalent clearcut condition and how much hydrologic recovery has taken place. For this analysis, watersheds with less than 15 percent of the forested stands at an age of 30 years or less exhibit a low risk for cumulative timing and yield impacts. Hazard and Hard Creek watersheds have about 8 percent and 10 percent, respectively, of their forested stands less than 30 years old.

Fish Habitat Condition

In August of 1992, a Forest Service Hankin-Reeves habitat inventory surveyed 6.5 miles of stream from the lower Forest boundary upstream to Hard Creek Meadows. The inventory identified four distinct reaches of A-type and B-type stream channel. These reaches were nearly all riffle habitat with 95 percent bank stability and low amounts of woody material except in reach #3 (above the project boundary). Fish habitat in Hazard Creek was also inventoried in 1992 with similar results. Inventory values are compared against Desired Future Conditions (DFCs) being developed for the Columbia River Basin Anadromous Fish

Habitat Policy Implementation Guide (1993). DFCs are **explicit** descriptions of the physical characteristics of aquatic habitats believed necessary to meet anadromous salmonid habitat requirements.

Pool Frequency - Sedell et al. (unpublished) determined that primary pools (greater than 1 meter deep) are critical to optimum survival of anadromous salmonids in third- to fifth-order Columbia River Basin streams, and that primary pools should occur at a rate that exceeds one per six channel widths. This DFC is applicable to streams with overall gradients less than 3 percent, which excludes both Hard and Hazard Creeks. The DFC for pools greater than 1 meter deep ranges between 0.1 to 0.4 pools per 100 meters. Hard and Hazard Creek values are 0.03 and 0.1 pools per 100 meters, respectively. Hazard Creek approaches the lower DFC value for metamorphic drainages with gradients less than 3 percent. Both streams would likely meet DFCs for steeper channels once these values are established.

Sediment - Sedell et al. (unpublished) recommended that fine sediments in spawning areas should not exceed 15 percent for anadromous streams in third- to fifth-order Columbia River basin streams. The current DFC ranges between 20.4 and 30.9 percent of fine sediment, depending on geology. In 1992 Forest Service measured values for Hard and Hazard Creek were 1 percent and 7 percent, respectively. The BLM measured cobble embeddedness in Hazard Creek at 14 percent in 1986, and at 35 percent in 1992. The percentage of fine sediment and cobble embeddedness are not directly comparable, and the two widely different values indicate some discrepancy. However, because the measured fine sediment value is far below the DFC value, overall substrate conditions for both streams are considered good.

Bank Stability - Draft DFCs for bank stability are available only for C-type channels. Bank stability for C-type channels in Hard and Hazard Creeks was measured at 97 percent.

Water Temperature - State water quality temperature standards for cold water biota specify water temperatures of 22 degrees Centigrade (C) or less, with a maximum daily average of no greater than 19 degrees C. The draft DFCs range between 4.8 and 10.2 degrees. For Hard Creek limited temperature data collected in August 1992 found an average of 12.8 degrees C, with a range between 8 and 19 degrees C. For Hazard Creek, temperature averaged 8.7 degrees C, with a minimum of 7.0 and a maximum of 11.0. The measurements taken for both streams are limited in number and reflect only one point in time. A comparison of DFCs with the limited data indicate that both streams meet requirements for Idaho State Water Quality standards for cold water biota, while only Hazard Creek meets requirements for chinook salmon spawning.

Fish Populations

In 1985, the Idaho Fish and Game Department estimated juvenile steelhead density by snorkeling in lower Hazard Creek at 12.3 fish per 100 square meters of stream (Idaho Fish and Game 1985). For three seasons between 1986 and 1988, the Bureau of Land Management snorkeled two pools (277 square meters) and estimated an average of 27.7 fish per 100 square meters (Bureau of Land Management 1999). In 1990, the Forest Service snorkeled ten pools (507 square meters) and estimated juvenile steelhead density at 29.0 fish per 100 square meters (USFS 1990). One dead adult chinook salmon, a spawned-out female, was found in Hazard Creek, a short distance below the complete barrier falls. This fish had an adipose fin, making it uncertain whether the fish was of wild or hatchery origin.

ENVIRONMENTAL EFFECTS

Land-disturbing activities, such as timber harvest and road reconstruction, may cause direct, indirect, and cumulative effects to fish and their habitats. Direct effects are those that cause immediate fish mortality, such as chemical spills in streams or fish harvest. Indirect effects are impacts separated in time and space from the land-disturbing activity and may affect fish over a long period of time. Examples include sedimentation in streams and changes in habitat quality from riparian timber harvest. Cumulative effects are the additive impacts when a number of unrelated, or related but discrete, management activities take place in a given area.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

The action alternatives would produce similar effects due to the fact that all alternatives would:

- Not construct any new roads or stream crossings,
- Use helicopter yarding to harvest timber, and
- Provide no-cut buffer zones along all perennial and intermittent channels.

No new road or stream-crossing construction eliminates potential sediment production both from construction activities and post-construction use. New road construction can also increase fish harvest by providing access to previously inaccessible areas.

Helicopter yarding of timber is the least soil-disturbing of logging methods, because logs are flown to landings rather than dragged across the ground by heavy machinery or a cable system.

Extensive riparian buffers would protect water quality and beneficial uses by providing no-cut zones within 300 feet of anadromous fish streams, 100 feet of perennial water, and 25 feet of intermittent streams channels. Riparian area trees and undisturbed vegetation filter up-slope sediment and reduce channel and near-channel erosion. Large, standing trees provide a future source of large woody material for the stream channel that eventually detains and stores sediment and moderates summer water temperature increases.

These measures would result in **insignificant and immeasurable impacts** to all components of water quality and fish habitat.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

PERCENT OVER NATURAL SEDIMENTATION

Most potential impacts to fish and their habitats are related to increased sedimentation from land disturbance and alteration of riparian communities. When sediment production exceeds a stream's ability to transport it, the amount of fine sediments increase on and within stream substrates. Salmonid populations can be adversely affected by the amount of fine sediment in stream substrate (Reiser and Bjornn, 1979). Spawning areas suffer because egg deposition and survival are limited when sediment fills the spaces between gravels, preventing the flow of oxygen and the flushing of metabolic wastes. Emerging fry and aquatic insects can also be

trapped and smothered by sediment deposition in the gravels. Rearing areas are diminished as sediment fills pools and other areas. Sedimentation of deep pools and coarse substrate, used for rearing and overwintering, limits the space available for fish.

Modeled sediment increases are considered in context with other watershed variables such as upland slopes, stream gradients, channel types, presence of downstream critical reaches, existing stream channel condition, sediment storage and routing effectiveness. Sediment modeling for the lower Hazard and Hard Creek drainages on the Forest indicate very low levels of sediment increases above natural levels (0.3 to 1.5 percent) for the existing condition (see WATER section). Off-Forest modeled estimates for downstream areas are somewhat higher (11.5 to 16.7 percent), reflective of the degree of activity off-Forest lands.

Alternative A would produce no new sediment in either the Hazard or Hard Creek drainage.

For the Hazard Creek drainage, **Alternative B** would produce a 0.3 percent increase, **Alternative C** a 0.1 percent increase, and **Alternative D** a 0.2 percent increase in sediment over the natural level. These extremely low estimates reflect the non-disturbing nature of helicopter yarding in meta-granitic soils, as well as the lack of riparian timber harvest and no new road and stream-crossing construction.

Within the Hard Creek drainage, BOISED estimates an increase of 0.9 percent for **Alternative B**, 0.8 percent for **Alternative D**, and no increase for **Alternative C** in percent over natural sediment.

For both drainages, modeled sediment estimates for all alternatives are virtually identical, and, with the implementation of site-specific BMPs, would likely result in no measurable sediment increase to either drainage. The existing road condition with the sale planning area is the primary sediment source. By providing adequate road surface drainage, improving the functioning of ditches, and stabilizing any eroding fill slopes, sediment production, in effect, would be zero.

AMOUNT OF ROAD CONSTRUCTED OR RECONSTRUCTED

Road construction, reconstruction and use are principal sources of sediment input to streams. No alternative would construct any new roads. **Alternative A** would not reconstruct any roads. **Alternatives B and D** would reconstruct 6.5 miles of roads. **Alternative C** would reconstruct 1.2 miles or roads.

Road reconstruction would produce small amounts of sediment in the short term, but reconstruction efforts, combined with mitigation measures listed in Chapter 2 of this EIS, would help stabilize existing road erosion and reduce sedimentation in the long term.

NUMBER OF NEW STREAM CROSSINGS CONSTRUCTED

Construction of road crossings in streams can increase sediment and remove stream areas from biological production. None of the alternatives would construct any new stream crossings.

PROXIMITY OF HARVEST TO PERENNIAL WATERS

The location of harvest units in relation to perennial waters influences the delivery of sediment to stream channels. In general, the closer an activity to a streamcourse, the greater the likelihood of sediments reaching the channel.

Alternative A does not harvest timber, so there would be no effects from harvest. **Alternative B** has 6.8 miles of harvest unit boundary close to perennial streams, **Alternative C** has 4.6 miles, and **Alternative D** has 4.8 miles. However, all action alternatives would adequately protect riparian areas and fish habitat by providing no-cut zones within 300 feet of anadromous fish streams, 100 feet of perennial water, and 25 feet of intermittent streams channels.

RISK OF TOXIC SPILLS

Toxic spills can harm fish directly through poisoning and indirectly through reductions of invertebrate species, a food source. The risk of a fuel or chemical spill is a function of probability and magnitude. While the probability of a spill on Forest lands may be low, magnitude may vary considerably with the species involved, the spill location, quantities, and types of fuels or chemicals. The most common materials usually hauled during timber management activities are gasoline, diesel, and helicopter fuels. The probability of spill is mostly a function of the length of road used for hauling timber.

All alternatives would pose a low risk of toxic spills. **Alternative C** would pose the least risk of the action alternatives to fish from toxic spills due to no entry into the Hard Creek drainage. Although low, **Alternatives B and D** would pose a somewhat higher risk to fish from toxic spills due to more road used for hauling and double the number of helicopter landings.

CUMULATIVE EFFECTS

All past, present, and reasonably foreseeable events that affect populations of fish result in cumulative effects. These events include changes in angling regulations, other timber sales and road construction, hydropower development, agriculture, prescribed fire, range management programs, and direct improvement of fish habitat.

The Little Salmon River contains approximately 343 acres of chinook habitat (McClure, 1989) and has been intensively managed and impacted in the past. Several sheep and cattle range allotments cover the entire area. Moderate to intensive timber harvest and recreation activities have occurred in most areas.

Hazard and Hard Creek drainages have received moderate levels of land-disturbing activities. Past harvest in the Hazard Creek drainage consists of about 900 acres of clearcut and 350 acres of partial cut, with approximately 30 miles of road construction. Past harvest in the Hard Creek drainage consists of about 1,200 acres of clearcut and 900 acres of partial cut, with approximately 45 miles of road construction. The Hard and Hazard Creek drainages contain about 4,500 acres of primary and 500 acres of transitory range and together support 570 AUMs on three sheep and one cattle allotment.

Cumulative effects on fish habitat and water movement with drainage basins are manifested in the following watershed processes: peak flows; surface erosion; slope stability; low flows; nutrient export; herbicide, pesticide, toxic chemical disposition; and water yield and supply. Land use affects rates of sediment production and transport, and these changes produce a variety of impacts: channels widen and become more shallow in response to increased sediment loads; soil erosion decreases site productivity; and sedimentation reduces reservoir storage capacities, smothers organisms, and alters riparian communities. Once sediment is generated by erosion on hill slopes, it is transported over the slopes to channel systems. Sediment is transported either in suspension or along the streambed. Sediment transport is typically sporadic, with long periods of temporary deposition on sand and gravel bars, streambeds, deltas, and floodplains

In Hazard and Hard Creeks, sediment deposition is often localized in pockets of slower moving water behind large rocks and debris, and in spaces between rocks in the channel. Due to the large amount of stream energy, the distribution and volume of fine materials in the stream rapidly change with flow conditions. Sediment deposition in spawning areas is low, and fine materials are being moved out of spawning gravels with each storm event. Sediment is not impairing reproductive success for redband/rainbow trout and steelhead trout, as evidenced by the number of fish in the stream.

In summary, the existing condition of fish habitat in Hard and Hazard Creeks is good and, in all likelihood, below any activity threshold beyond which productivity is impaired.

In the Hazard and Hard Creek drainages, any sedimentation increase within the watershed, without implementation of the proposed riparian prescriptions, would not meet objectives for anadromous fish management. However, the use of helicopter yarding, the lack of new road or stream crossing construction, and the extensive riparian buffer design would result in no increase in sediment production and deposition in Hard or Hazard Creek drainages nor result in any impact to fish habitat or threatened, sensitive, or management indicator species.

FOREST PLAN CONSISTENCY

All alternatives exceed Forest Plan fish habitat objectives for both streams. Cumulatively, modeled sediment increases in the Hard and Hazard drainages are extremely low. Sale design features, avoidance of activity in riparian areas, and mitigation measures would fully compensate for any potential sediment increase concurrent with implementation of any action alternative.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS

All alternatives would make no irreversible or irretrievable commitment of fish resources.

Forest Dynamics

Forest Dynamics was not raised as an explicit issue for this sale. However, Forest Service direction and recent research recognize such dynamic factors as natural succession, fire and fuels, insects and disease, and introduced plants as important elements in ecosystem sustainability and health. These factors will determine the condition of the future forest to a greater degree than any management activity considered.

FOREST PLAN DIRECTION

Natural Succession - Diversity is measured by the interspersion of plant community types and successional stages (page II-27).

Fire and Fuels - Provide for an acceptable fire hazard level in a cost-effective and planned manner for activity fuels (slash) associated with timber projects (page IV-50).

Insects and Disease - Use appropriate silvicultural methods to help alleviate existing insect and disease problems and reduce the future potential for problems (page IV-50).

Introduced Plants - Control noxious and undesirable weeds (page IV-44).

DESIRED FUTURE CONDITION

Natural Succession - An interpreted desired future condition is that diversity is maintained across the Forest through well-distributed successional stages, resulting in a variety of plant communities and age classes.

Fire and Fuels - Reduce fuel accumulations in intensively managed timber stands to reduce the risk of wildfire and to allow fire to assume a more natural role in suitable areas. Wildfires that threaten life, private property, public safety, improvements, or investments will receive aggressive suppression action (page IV-124).

Insects and Disease - An interpreted desired future condition is that future insect and disease problems will be reduced and controlled through silvicultural and biological methods.

Introduced Plants - The increased level of noxious weed and undesirable vegetation control will reduce the spread of the weeds into suitable range areas (page IV-44).

AFFECTED AREAS

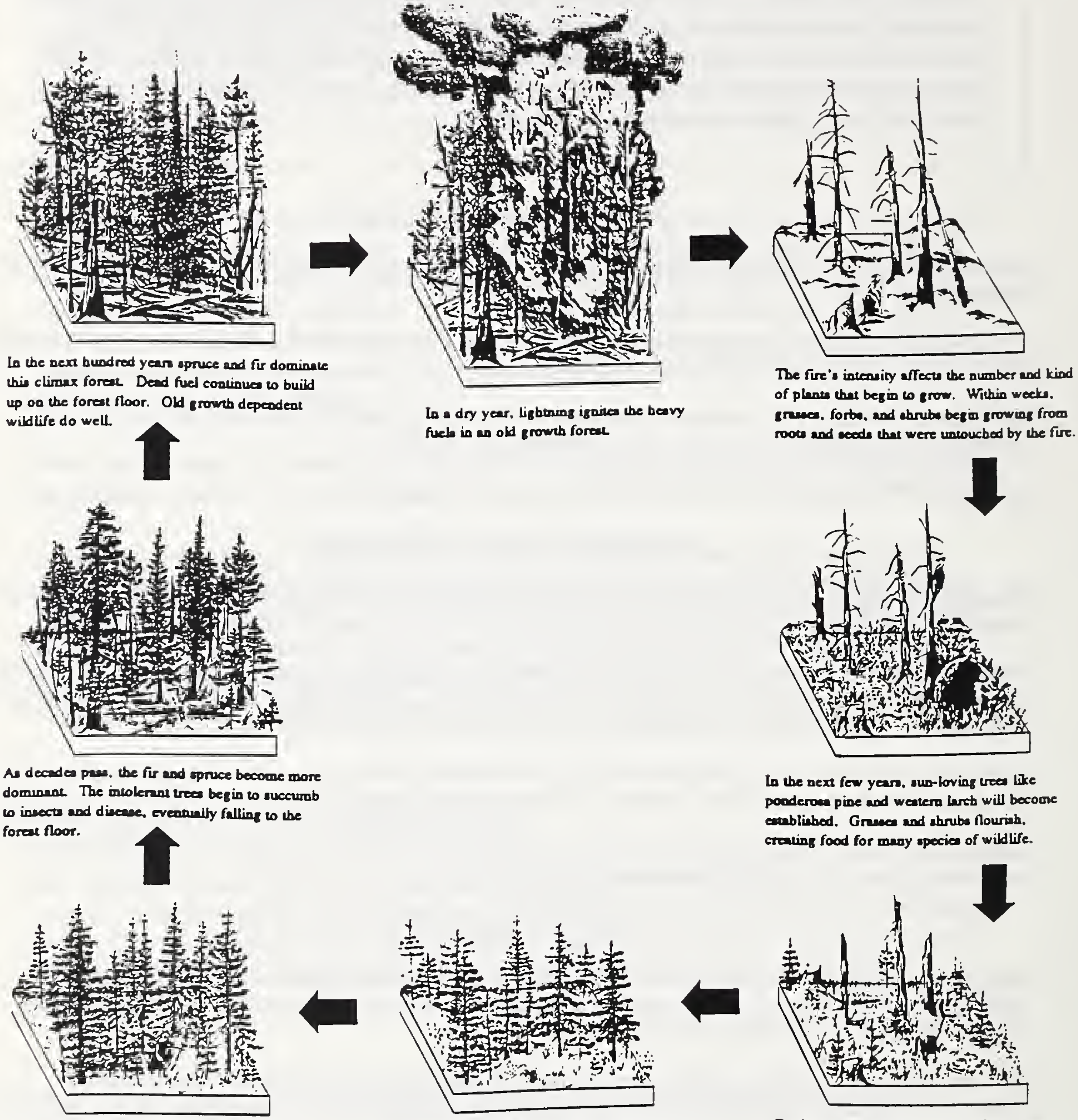
Natural Succession - The planning area may be directly and indirectly affected. The subwatersheds containing the planning area, and surrounding subwatersheds to the north and south, may be cumulatively affected (Figure 3-7 in Biological Diversity section).

Fire and Fuels - Fire and fuel treatments may directly affect the sale planning area. Fire management practices in the planning area may indirectly or cumulatively affect adjacent portions of the Forest.

Insects and Disease - The harvest units in the planning area may be directly affected. The subwatersheds containing the planning area, and surrounding subwatersheds, may be indirectly and cumulatively affected (Figure 3-7 in Biological Diversity section).

Introduced Plants - Disturbed areas (landings, roads, harvest units) within the planning area may be directly affected. The subwatersheds containing the planning area, and surrounding subwatersheds, may be indirectly and cumulatively affected (Figure 3-7 in Biological Diversity section).

Figure 3-4. Mixed Conifer Forest Succession



In a dry year, lightning ignites the heavy fuels in an old growth forest.

The fire's intensity affects the number and kind of plants that begin to grow. Within weeks, grasses, forbs, and shrubs begin growing from roots and seeds that were untouched by the fire.

In the next few years, sun-loving trees like ponderosa pine and western larch will become established. Grasses and shrubs flourish, creating food for many species of wildlife.

During the next decade, the small trees grow rapidly. Animals like deer, elk, and mountain bluebirds benefit from the grasses, shrubs, and berries.

Within 25 years, the trees begin to shade some of the grasses and shrubs. While some animals begin moving away, others like snowshoe hare, bobcat, and grouse benefit from the increased cover.

At 50 to 100 years, shade tolerant trees like grand fir, Engelmann spruce, and subalpine fir begin to grow underneath the older trees. The forest floor becomes more shaded and many grasses and shrubs decline. Elk and deer have shelter here but little food.

As decades pass, the fir and spruce become more dominant. The intolerant trees begin to succumb to insects and disease, eventually falling to the forest floor.

In the next hundred years spruce and fir dominate this climax forest. Dead fuel continues to build up on the forest floor. Old growth dependent wildlife do well.

AFFECTED ENVIRONMENT

Forests are constantly changing over time as forces of nature and human activities combine to alter succession, permanently convert habitats to other uses, and fragment the forest. This section identifies how some of these historic changes have created the current situation. By looking at natural processes, we are provided clues to the types and levels of human disturbance that may be within the range of natural disturbance. Some ecologists believe that the closer human activities—such as timber harvest—resemble natural disturbance, the less the impacts of those activities will be to nature (Swanson and Franklin 1992). Our knowledge of the past limits our analysis to relatively recent history. Conditions before Native Americans arrived in the area could have been very different from conditions that existed when European settlers arrived in the Western United States (referred to here as *presettlement conditions*).

NATURAL SUCCESSION

Many ecological functions are affected by the relative distribution of successional stages. The important ecological functions of succession are analyzed in detail in several sections of this EIS. Since succession may mean different things to different people, the following discussion interprets important aspects of succession for this EIS.

The forests in the Hazard Helicopter planning area are constantly changing through a gradual process called *forest succession*. Succession begins from a major disturbance event, and may proceed to a condition called *climax*. The process of succession varies from one habitat type to the next. Factors that influence the process include seed availability, abundance of sprouting species, topography, soil characteristics, climatic conditions, and fire intensity, frequency, and size. Figure 3-4 illustrates a typical mixed conifer successional cycle in the roadless area that might follow a stand replacement event such as a major fire, windstorm, or clearcut.

Succession consists of six distinct stages, ranging from grass/forb to old growth. The Payette National Forest has mapped these stages along with some productivity measures and named the categories "strata" (Demetriodes 1993). To simplify successional stage analysis in this EIS, these strata have been divided into the four major stages described below. The old-growth stage is analyzed in more detail in the Biological Diversity section.

Initially, shade-intolerant species of trees, grasses, and shrubs appear in the highly diverse and productive <u>grass/forb stage</u>. Snags and down logs remain from the original pre-burn stand to provide wildlife habitat. As the forest ages, tree crowns develop and the ground becomes more shaded in the <u>seedling/sapling stage</u>; new shade-tolerant species colonize while understory species that need lots of sunlight begin to disappear. Diversity decreases.

The intermediate <u>immature sawtimber and pole stage</u> is often the least diverse stage, typified by dense tree cover and sparse understory. Remnant snags and down logs are disappearing. As decades pass, shade-tolerant trees grow slowly until they begin to out-compete the initial plant species in the stand for sunlight and moisture.

Eventually, the stand reaches the <u>mature sawtimber and climax old-growth stage</u>, and diversity increases because the stand now has shade-tolerant species as well as early succession species that reappear in canopy gaps where trees die and fall over from insect, disease or wind. Watersheds with the greatest biological diversity will have all of these stages represented.

Figure 3-5. Existing Successional Stage Distribution in the Planning Area

In a departure from this typical successional pattern, frequent light fires, insects, disease, or windthrow often keep stands relatively open as they age, thereby delaying the development of a climax stand for an indefinite period. This delayed climax condition results in a stand that can be called non-climax old growth, or *seral old growth.*

Hazard Helicopter Planning Area

Under presettlement conditions, most of the stands on the south-facing slopes of the planning area were probably open stands of seral old-growth ponderosa pine maintained by frequent fires. These stands were similar but more open than stands that occupy the same sites today. At elevations above about 5,500 feet this open habitat gave way to climax old-growth grand fir, with old-growth spruce in wet areas in the central part of the planning area. The pine stand understories were made up of grass and low shrubs, while the spruce and grand fir stands had an understory of herbaceous plants, huckleberry, and alder.

The primary differences between presettlement stand conditions and those of the present are: 1) the increase of young fir trees in the understory, and 2) a slight build-up of fallen needles and dead branches on the ground.

Successional stage distribution for the Hazard Helicopter planning area is presented in Figure 3-5. Much of the forested area is in mature/old-growth and immature sawtimber stages. The remaining area is mostly occupied by brush and habitats incapable of supporting dense tree growth. Much of the brush is on very steep slopes that occur in the southern part of the area.

FIRE AND FUELS

Fire is the major process that influences succession over the forest. During presettlement times, fires in west-central Idaho occurred at intervals from every 50 years on dry grand fir types to over 150 years on moist sites (Barrett 1987). On very dry ponderosa pine sites, fires were even more frequent. The Payette Forest is on the edge of a broad lightning zone that lies across the Clearwater and Nez Perce Forests to the north and probably has more lightning-caused fires than anywhere else in Idaho or Montana (Steele et al. 1981).

Natural fires (set by Native Americans and lightning) were frequent enough to kill shade-tolerant species such as grand fir and ninebark, which were taking the stand toward climax. These fires created open, seral old-growth stands of fire-resistant ponderosa pine, western larch, and Douglas-fir. Aspen, ceonothus, and willows occurred in the openings.

Historical descriptions and photographs of ponderosa pine and Douglas-fir forests in similar areas indicate that most stands were seral old growth characterized by a single story of large trees and few understory trees (Keane et al. 1990). At higher elevations, or on shaded north aspects or moist areas, the natural fire cycle is less frequent, sometimes occurring at 50- to 100-year intervals or greater. This allows some natural stands to approach the climax stage of forest succession and to develop a multi-storied structure that is more naturally prone to severe crown fires.

Periodic small fires create a mosaic of vegetative age classes and types that provide diverse wildlife habitat, reduce continuous fuel loads, and cycle nutrients into the soil. Large wildfires, on the other hand, can increase stream sediment, damage wildlife habitats, and temporarily

degrade air quality and recreation opportunities.

Hazard Helicopter Planning Area

Seven fires have burned within the planning area over the past 22 years. All fires burned less than 10 acres. Ground access is limited to roads near or along the western boundary of the area. Shade-tolerant climax species are beginning to create a ladder fuel situation. Light grazing occurs, but does not significantly effect the finer grass fuels.

Previous logging activity in the area has resulted in a mixture of younger and older stands. Numerous private ranches and homes exist off forest lands and below the area. The steep slopes on this westerly aspect tend to rise from the river bottom to the ridge top without breaks or moderation. Potential is high for human-caused fires to spread rapidly up slope and onto forest lands.

INSECTS AND DISEASE

Presettlement conditions of insects and disease were likely limited to small scattered occurrences across the forest, primarily in climax old-growth patches and dense stands of young trees. Many insects, such as Douglas-fir tussock moth (*Orgyia pseudotsugata*), periodically increase to outbreak levels that may last 3 or 4 years and then subside. Even during outbreaks, only 40 percent of infected trees die (Weatherby et al. 1991). These periodic cycles have always occurred and were probably more severe during drought periods.

Insect and disease problems become worse as trees become stressed from drought or from the competition for sunlight and water that occurs with high tree densities. For example, mountain pine beetles have been shown to cause little tree mortality except in stands where high tree densities have greatly reduced tree growth (Schmid and Mata 1992).

Outbreaks of insects and disease are increasingly common in the mixed conifer stands on the Forest. Dwarf mistletoe, spruce budworm, and Douglas-fir tussock moth thrive on closed-canopy, multi-storied stands. Several scientists consider the current insect and disease problems throughout central Idaho to be a direct result of the extensive control of wildfire (Thier, 1990, personal communication).

A lack of fire allows shade-tolerant grand fir and Douglas-fir to establish under canopies of ponderosa pine and larch. These fir trees are more susceptible to root diseases that lower their resistance to attack by insect pests. The lack of fire allows stands to become overstocked with more trees than the available water and space can support, further stressing trees in the understory. Root diseases and mistletoe are more easily transmitted from tree to tree in dense stands (Hagle and Goheen 1988).

Hazard Helicopter Planning Area

In the planning area, spruce beetles are not attacking large acreages of spruce as in other parts of the Forest, and other insect and disease problems were not observed to be extensive. Scattered occurrences of Douglas-fir mistletoe and grand fir root rot were noticed. On south-facing slopes, pine beetle tree mortality is occurring in drought-stressed older trees.

INTRODUCED PLANTS

Introduced plants can affect entire ecosystems by reducing native plant populations through direct competition for water, sunlight, and nutrients. If native plant populations fall below sustainable levels, plant species can eventually be lost in the affected area. This not only reduces the biological diversity of plants in that area, but, through displacement, also indirectly reduces the diversity of animal species that are dependent on those native plants (Deloach 1991).

Timber harvest activities disturb soils, providing an avenue for invasion by non-native plants, including noxious weeds. Roads further this potential by providing corridors for invasion. Livestock may hasten this invasion by trailing along roads and spreading weeds through droppings. Because these weeds usually require lots of sunlight, however, they often die out of harvest units as trees grow and shade the ground.

In addition, non-native invasions can move very rapidly. As an example, spotted knapweed spread from a few small, scattered patches in the 1950s to cover nearly 4.7 million acres of Montana forest and rangeland by 1990 (Roche and Roche 1991).

Hazard Helicopter Planning Area

Noxious weeds and introduced non-native plants are currently absent over most of the planning area. Local patches occur in areas of past disturbance, such as the patch of leafy spurge at the end of the Hazard Creek Road. Scattered populations of non-native plants may also occur along sheep trailing routes.

ENVIRONMENTAL EFFECTS

Effects of management alternatives on forest dynamics and disturbance events are real and strongly influence all of the species that make up forest ecosystems. In a cumulative sense effects of various alternatives determine the sustainability of ecosystems. Evaluation of effects on ecosystems cannot always have standards and guidelines and must be evaluated for level of importance as well as positive or negative impacts using the best professional judgement of resource specialists.

DIRECT AND INDIRECT EFFECTS

NATURAL SUCCESSION

Timber harvest activities generally have the result of setting back succession from mature and old-growth successional stages to the grass/forb, seedling/sapling, or pole/immature stages depending on prescription. Similarly, ground disturbance activities such as tractor scarification of the soil, favor early successional plant species over late successional plant species.

Clearcuts create conditions favorable for grass/forb successional stages and annual invader species of plants. Shelterwood and commercial thin prescriptions generally create conditions similar to seedling/sapling or pole/immature stage, depending on stand conditions of the

harvest units.

A major wildfire could occur in the planning area over the next 20 years, resulting in a major modification of successional stage distribution over the landscape. Such an event is unpredictable, however, and the following analysis considers the impacts of alternatives in the absence of such an event.

Alternative A - This alternative would allow natural succession to continue with no modification by timber harvest activities during the planning period. Wildfire suppression would continue in the planning area. This fire control would direct succession in mature and old-growth stands toward a climax condition rather than a seral old-growth condition. Overall, successional stage changes would be minor (Figure 3-6), because succession moves slowly in the absence of large fires. Small fires are likely, but would be quickly extinguished and would affect only minor acreages (see Fire and Fuels Effects below).

Under this alternative, the area would remain within the natural range of presettlement conditions for all stages of succession except, perhaps, for the low percentage of the seedling/sapling stage, which could nearly disappear. The loss of this stage would decrease biological diversity within the planning area.

Over the next 20 years, the grass/forb/shrub stage would likely decrease slightly as tree seedlings invade the edges of brush fields created by past fires. The seedling/sapling stage could decrease overall as most of the existing seedling/sapling areas move into the pole/immature stage.

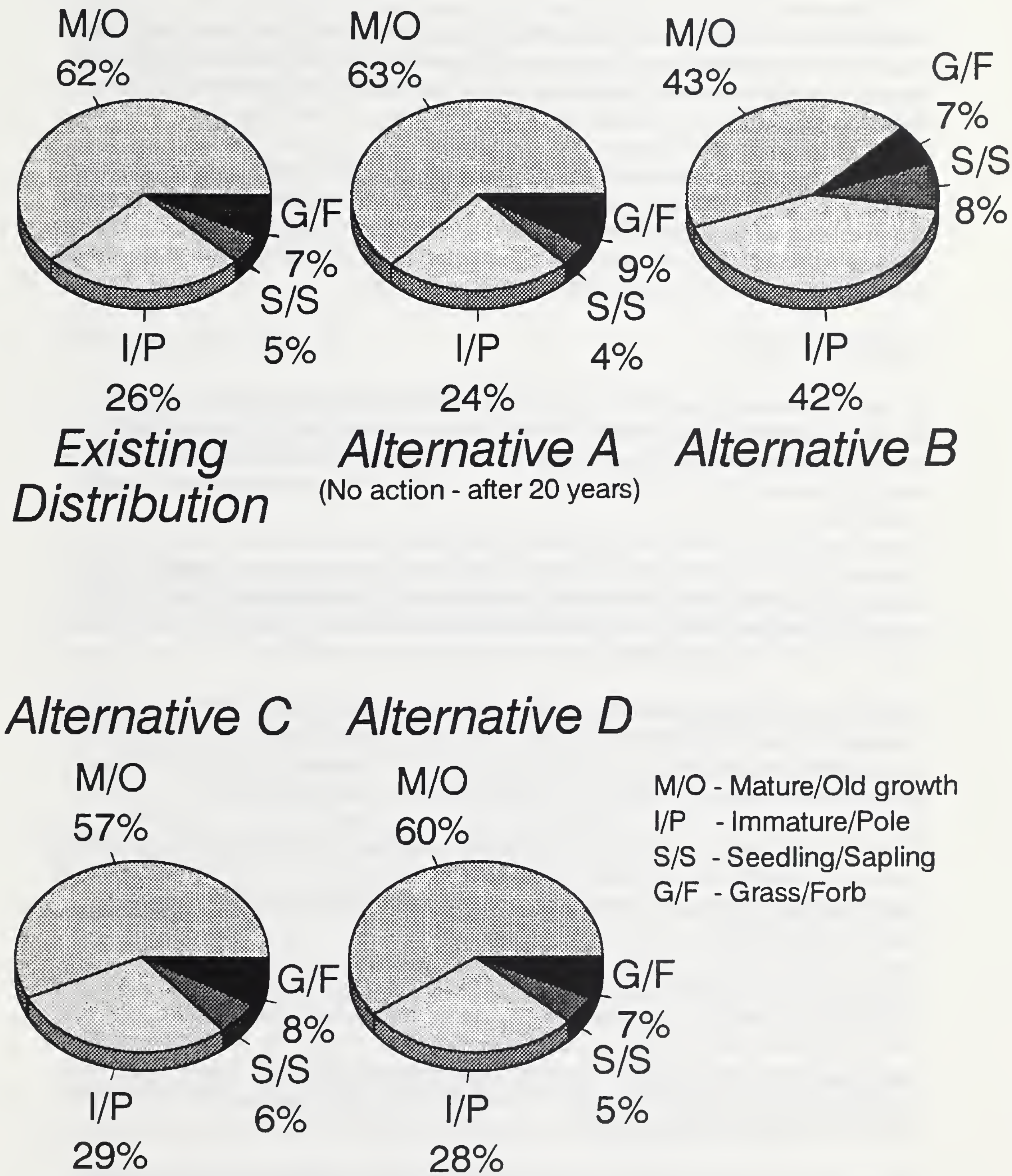
The pole/immature stage is the most fire-protected stage and is most likely to remain stable; although, it could decrease slightly as some of the older immature stands reach mature status. The mature/old-growth stage is most likely to support wildfires, but in the absence of a major fire this stage will increase. Snags and down logs will slightly increase as pole/immature stands reach the mature/old-growth stage.

Alternative B - This alternative would reduce the mature/old-growth stage more than any other alternative, from 47 to 28 percent (Figure 3-6). Removal of the overstory trees in shelterwood harvest units would release the young trees, poles, and immature sawtimber. This entry would create little grass/forb or seed/sapling successional stages. Areas within shelterwood units that do not have a developed pole/immature understory would not have the overstory removed (see Timber section in this chapter). Therefore the grass/forb and seed/sapling stages would not be created.

This alternative would move the mature/old-growth stage to the lower edge of the natural range of presettlement conditions. Seral old growth currently comprises a large percentage of this planning area, as it likely did under presettlement conditions. Decreasing this stage would likely decrease biological diversity within the planning area.

Many snags would fall in shelterwood harvest units, substantially increasing the number of down logs. These logs would remain following slash treatment, as they would after a wildfire. Fewer snags would remain than after a wildfire, but those remaining would be high quality, uncharred by fire.

Figure 3-6. Successional Stage Distribution in the Planning Area by Alternative



Alternative C - This alternative would reduce the old-growth/mature successional stage by five percent and increase the pole/immature stage by three percent, while having no effect on the grass/forb/shrub stage (Figure 3-6). The clearcut in this alternative would increase the seedling/sapling stage by one percent, moving this stage closer to presettlement conditions. Snags and down logs would remain at high levels throughout most of the planning area.

Alternative D - This alternative would create only a minor change in the successional stage distribution of the planning area (Figure 3-6). The uneven-aged harvests would modify stand structure in mature/old-growth successional stages, but retain enough large trees after this harvest entry to maintain the existing mature/old-growth successional stage.

Under presettlement conditions, the mature/old-growth successional stage probably had many natural small openings caused by insects, disease, wind storms and small fires, not unlike those that would be created by the uneven-aged harvest prescription. This alternative would improve the successional stage distribution over the planning area. Snags and down logs would remain at high levels outside of harvest clearings over the entire area.

FIRE AND FUELS

For all action alternatives, timber harvest would affect forest vegetation and fire and fuel hazards. Clearcutting would result in 25 to 60 tons per acre of slash. Shelterwood and uneven-aged cutting methods would result in 12 to 25 tons. Without treatment, these fuels would increase the risk of wildfire and serve as receptive hosts for damaging insects, such as bark beetles.

Lop and scatter fuel treatments could increase the fire hazard in some stands until needles and twigs begin to decompose. This type of treatment is usually prescribed only in areas where natural fuel loadings are low, and burn prescriptions are difficult or expensive to conduct. It is also prescribed where burn damage to other resources may be excessive.

Prescribed burn fuel treatments would reduce the risk and spread of high-intensity wildfire by reducing the fine and moderate-sized fuels. These fuel types are the main receptors for ignition and the main carriers of fire spread. Treatments would be conducted at times and under conditions that maximize benefits while reducing the risk of resource damage.

Estimates of treatments and acres in this EIS will be verified on the ground during the preparation of a site-specific Prescribed Burn Plan. This plan is prepared after the sale is marked and re-verified after harvest. See Appendix K for a description of the fuel treatment methods considered in this EIS.

Alternative A - The potential for major uncontrollable wild fires would continue to increase as fuels build and small fires are controlled. A possible alternative to a large wildfire would be several medium-sized fires over the planning period which would create a better mosaic of young age classes fireproofing the remaining mature/old-growth stands. The presettlement conditions of extensive areas of seral old growth maintained by frequent ground fires are not likely to return under this alternative.

Alternative B - This alternative would reduce the acreage of the oldest and most fire-prone stands, thereby reducing the size and intensity of wild fires more than any other alternative.

About 190 acres of lop and scatter fuels treatment would occur on mostly south-facing steep slopes where natural fuels are scarce. This alternative would also jackpot burn about 390 acres and YUM pile and burn 255 acres to reduce fuel loadings to acceptable levels.

Alternative C - This alternative would reduce the wildfire risk only in the north end of the planning area. The remainder of the planning area would continue as under Alternative A. About 105 acres of lop and scatter treatments would be used on mostly south-facing slopes where natural fuels are scarce. Another 100 acres would be treated with one of three types of burns: jackpot burning, broadcast burning (in the clearcut unit), and YUM pile and burning.

Alternative D - This alternative would also substantially reduce the risk of large fires by harvesting in the most fire-prone stands. About 140 acres of lop and scatter fuels treatment would be done on sites where natural fuel loadings are low. About 230 acres of jackpot burning would occur mostly in small openings created in uneven-aged harvest units. Where fuel density is high and burning on-site could damage residual trees, YUM yarding and pile burning would be done. This would occur on about 185 acres.

INSECTS AND DISEASE

A major goal of all timber harvest prescriptions is to reduce insect and disease within the harvest units and surrounding areas. In most situations there is a major short-term decrease in insects and disease as trees infected with mistletoe, root rot and other insect and disease problem trees are harvested.

Over the long term; however, insect and disease problems can be increased by timber harvest unless care is taken to guard against potential problems. It is now recognized that creating conditions such as single species plantations, planting non-adapted tree stocks, damaging trees during thinning operations, and overstocking units can lead to long-term problems. Harvest prescriptions for the planning area are designed to minimize these pitfalls.

Alternative A - This alternative would not alter the present insect and disease cycles. The seral old-growth stands would continue toward an increase of climax tree species in the understory. These trees would contribute to a slightly increased risk of insect and disease outbreaks from Douglas-fir tussock moth, Douglas-fir beetle, and western balsam bark beetle (Weatherby et al. 1991). A build-up of dead branches from insect damage would increase the risk of wildfire. A major epidemic that would kill most overstory trees is not likely.

Alternative B - This alternative would reduce the potential for a pine beetle outbreak in the shelterwood units by removing many of the high-risk overstory trees, by increasing the distance between the remaining potential host trees, and by reducing shade and water stress of understory trees. Slash accumulation that could serve as breeding areas for pine beetles would be reduced through prescribed burning or YUM yarding and burning.

The large acreage of shelterwood harvests could attract the Douglas-fir tussock moth that is currently increasing in parts of the Payette and Boise National Forests. Douglas-fir beetle populations would be reduced by removal of high-risk, large trees of this species.

Alternative C - This alternative would have little affect on insects and disease in the planning area because of the small acreage harvested. A slight increased risk of outbreaks would occur,

as in Alternative A. The young trees created by the prescribed clearcut and shelterwoods would be relatively free of insect or disease problems for the planning period. No large amounts of slash accumulations would be left in units to provide insect breeding areas.

Alternative D - The uneven-aged prescriptions of this alternative could increase the risk of root disease spreading into the remaining trees, especially grand fir. As trees are felled they may scrape other trees and provide a wound that could be a source of fungus infection. Because helicopters are to be used, this risk is much less than with a tractor operation where the equipment can also scrape trees. No large accumulations of slash would be left in uneven-aged units that would increase the potential for insects breeding in slash and infecting residual trees.

INTRODUCED PLANTS

All alternatives provide only minimal amounts of bare ground for noxious weed invasion and no new roads that could become corridors of weed invasion. The greatest disturbance and the least amount of remaining shade would be in the clearcut unit of Alternative C; therefore, this is the most extensive area for weed invasion of any alternative. The large areas of uneven-aged harvest in Alternative D present the next greatest invasion potential of all alternatives, as some soil would be disturbed and more sunlight would reach the ground.

Alternatives B and D would construct the most log landings and reconstruct the most miles of road. These activities could slightly increase existing weed populations in those areas, but the weeds would be unlikely to spread into surrounding forests with established vegetation. In fact, no alternative is likely to spread any introduced plant species to the extent that they would displace any native species or affect biological diversity within the planning area.

CUMULATIVE EFFECTS

NATURAL SUCCESSION

Over time, repeated future entries following the implementation of either Alternative B or C would probably not greatly alter the successional stage distribution that would exist following initial harvest. This is because the Forest Plan designates most of the planning area for extensive, rather than intensive, management. Under Alternatives A and D, future entries could occur and substantially alter successional stage distribution because more mature/old-growth timber would remain for future extensive harvest. Under Alternative A, the trend toward more mature/old growth increases the potential that most of this stage could be replaced by early successional stages during a major fire event.

FIRE AND FUELS

Previous sales in and near the Hazard Helicopter planning area have reduced fuel loadings in the cutting units and provided road access to portions of the area. This road access has aided in both prescribed burning and wildfire suppression efforts.

The proposed sale would create a temporary increase in fuels on the ground immediately after logging. This would result in a short-term increase in the fire risk until adequate fuel treatment

is done (usually one year or less). The overall fire hazard would be reduced from existing levels by breaking up continuous fuels from timber harvest and by improving road access for fire suppression forces.

In the future, as more of the subwatersheds south and north of the planning area come under management, wildfires will decrease because of better road access and increased fuel treatments. Also, the increase of early successional stages and immature trees will reduce the risk of fire starts and high-intensity fires in those areas.

INSECTS AND DISEASE

Insect and disease problems would generally decrease in the future as subwatersheds north and south of the planning area are managed intensively for timber. Timber sales would accelerate the harvest of high-risk trees, create earlier successional stages over the subwatersheds, and maintain a diversity of tree species.

INTRODUCED PLANTS

Currently, dalmation toadflax is rapidly increasing in and around Meadows Valley, and a few locations of knapweed are known. These weeds have the potential to spread over native plant communities, displace native species, and alter biological diversity.

Greater soil disturbance and road construction throughout the subwatersheds along the Little Salmon River in the future will increase the risk of noxious weed invasion. The cumulative risk of serious weed invasion as a result of all proposed timber harvest in the area seems small because clearcuts are unlikely to be prescribed and because road design will likely be low-standard construction.

FOREST PLAN CONSISTENCY

All alternatives would be consistent with the Forest Plan regarding these resource effects.

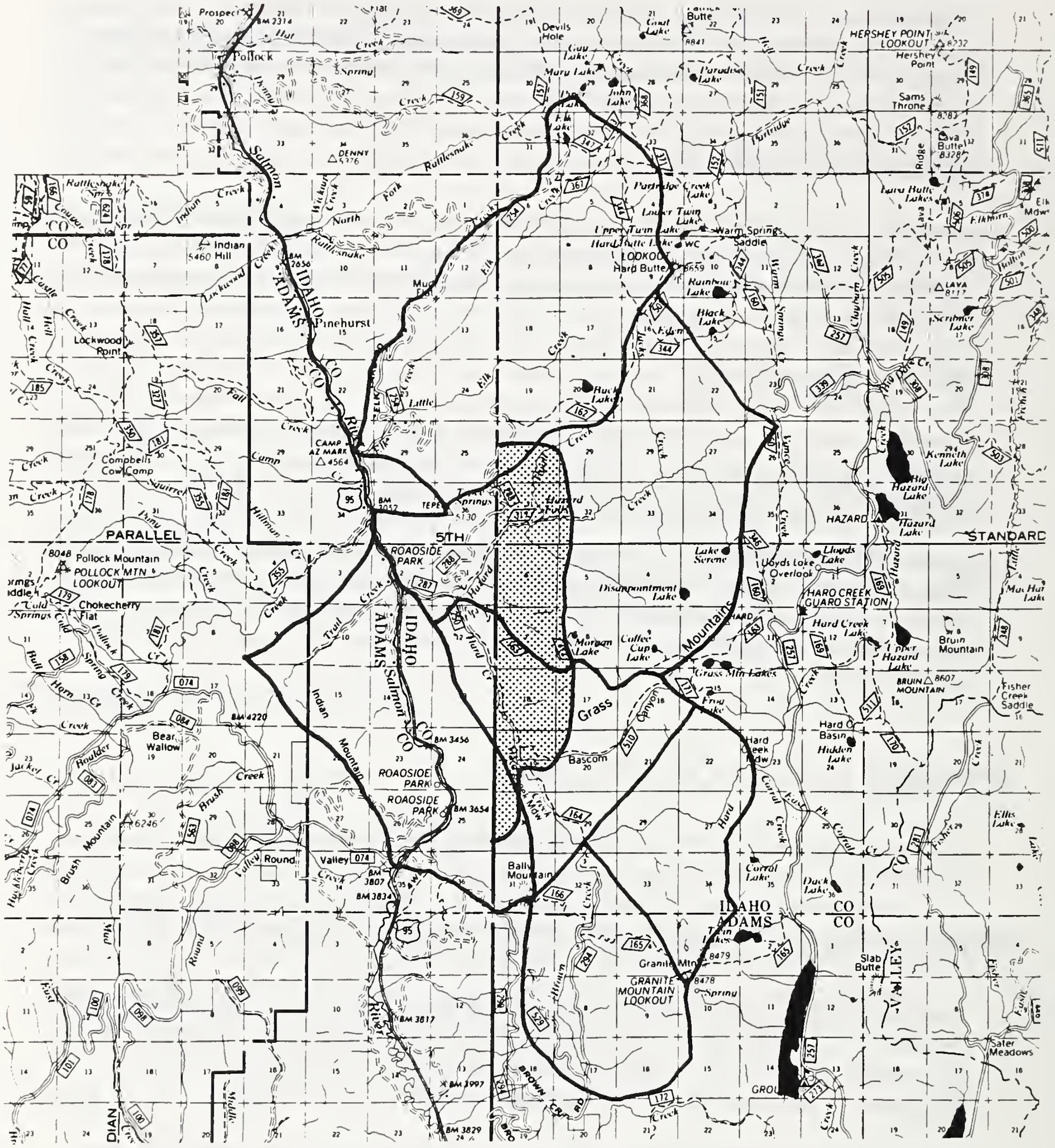
IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT

Wildfires, including escaped prescribed burns, affect all forest resources and cannot be totally avoided. The damage they do to soil, timber, and other resources can be irreversible. Site productivity and tree cover would eventually return but could take decades. The action alternatives would lessen the risk of high-intensity wildfire in the long term.

Similarly, major outbreaks of insects, disease and introduced plants can irretrievably alter ecosystems. However, this analysis found the level of risk for such outbreaks to be low at this time.

There would be no other irreversible and irretrievable commitment of resources as a result of any of the proposed alternatives.

Figure 3-7. Affected Areas for Biological Diversity



Planning Area Boundary

Subwatershed Boundary

Biological Diversity

Issue: The effects of the proposed sale on the amount of forest in old-growth condition.

Indicator: Percent of old-growth remaining in planning area

Issue: The effects of the proposed sale on fragmentation of existing mature and old-growth forest in the planning area.

Indicator: The amount of unfragmented mature/old-growth forest blocks and biological corridors in the planning area

Issue: The effects of the proposed sale on special vegetation habitats in the planning area.

Indicator: Effects on special habitats in the planning area

Issue: The effects of the proposed sale on threatened, endangered, and sensitive (TES) plant species in the planning area.

Indicator: Effects on TES plants in the planning area

FOREST PLAN DIRECTION

Old Growth - Retain a minimum of 5 percent old growth or mature forest within each theoretical pileated woodpecker home range. All timbered acres will be used to achieve this requirement. Old-growth stands must be at least 30 acres in size (page IV-34).

Fragmentation and Biological Corridors - No specific direction.

Special Habitats - No specific direction.

Threatened, Endangered, and Sensitive Plant Species - In early stages of project planning, a survey of the area, as well as adjacent area, will be made to ensure the protection of all threatened and endangered plants located on the Payette National Forest (page IV-48).

DESIRED FUTURE CONDITION

The Forest Plan does not have a desired future condition for any of the resources discussed in this section. Using the latest research and ecosystem management direction from the Forest Service, the following desired future condition has been developed for this EIS:

Old Growth - The planning area will retain sufficient old growth in a sustainable basis over time to maintain all old-growth dependent species presently residing in the area. This old growth will occur in a condition, distribution, and patch size within the normal range of presettlement conditions.

Fragmentation and Biological Corridors - Mature and old-growth forest successional stages will occur across the landscape in a pattern of connectivity and patch size that allows unrestricted movement among animal populations, and that does not genetically isolate populations of plants or animals.

Special Habitats - Special habitats within the planning area will continue to provide all the functions (for use by plant and animal populations) that make them uncommon, unique, or special on the Payette National Forest.

Threatened, Endangered, and Sensitive Plant Species - All species of plants identified as TES will continue to exist in present numbers and distribution within the planning area and may increase slightly as a result of habitat protection.

AFFECTED AREAS

For all issue indicators, direct and indirect effects are analyzed for the timber sale planning area, and cumulative effects are analyzed for the watersheds containing the planning area and the adjacent watersheds to the north and south (see Figure 3-7).

AFFECTED ENVIRONMENT

Biological diversity includes all life forms, both plant and animal. Therefore, the discussions presented for all biological resources in this chapter are, in a larger sense, discussions of biological diversity. This section, however, focuses on certain elements of biological diversity that were of particular concern to both the public and resource specialists. These elements are old growth, fragmentation and biological corridors, special vegetation habitats, and sensitive plant species. For discussion on how wildlife biological diversity would be affected by the proposed alternatives, see the Wildlife Habitat section of this chapter.

The distribution of successional stages represented across the forest has a major influence on the diversity of plants and animals. For example, Huff et al. (1985) documented a change in bird species diversity following fire as successional stages developed. The greatest diversity occurred in the young and old successional stages, with the least diversity in intermediate stages. The loss or reduction of an existing successional stage within a watershed could temporarily reduce the biodiversity of the watershed and alter the distribution of some species across a larger landscape.

One of the most obvious impacts of timber harvest, especially clearcuts, is the change of successional-stage landscape patterns across the forest that fragments large patches of mature and old-growth forest. When habitat is fragmented, wildlife dispersal may be impeded to varying degrees, and the matrix and distance between habitat patches may affect the stability of populations, the establishment of new populations, and the long-term persistence of mobile species (Lubchenco et al. 1991). Therefore, the following discussion addresses landscape patterns and their relationships to biological diversity.

OLD GROWTH

Old growth provides a unique wildlife and plant habitat because of a high plant biomass, structural complexity, and many different microsites. Old growth is the most sensitive of all successional stages in the forest for several reasons. Old growth is lost in a variety of ways, such as fire and timber harvest, and once lost, it takes many decades to replace. Timber management goals do not include creating or maintaining this successional stage, and where it is to be maintained on timber management acres, additional reasons and guidelines must be developed for its retention.

Currently, large blocks of high-quality old-growth forest occur throughout the center of the Hazard Helicopter planning area (Figure 3-8). This old growth represents the oldest portions of the <u>old growth/mature forest</u> successional stage discussed under Fragmentation below.

Figure 3-8. Old-Growth/Mature Forest Blocks and Corridors In the Planning Area

FRAGMENTATION AND BIOLOGICAL CORRIDORS

Many scientists believe biological diversity analysis must look at the distribution and connectivity of habitat patches over a large area. According to Odum (1992), "the focus on preserving biological diversity must be at the landscape level, because the variety of species in any region depends on the size, variety, and dynamics of (ecosystem) patches."

The planning area has relatively large patches of interior forest, some of them created during the 1910 fires, that are primarily old growth and mature stages. Other large patches of pole-stage forest are a result of wildfires in the 1920s, 30s, and 40s. These patches of forest are naturally fragmented by areas of brush and high elevation meadows and rocky steep slopes (see Figure 3-8).

Although the statistical and geometric analysis of fragmentation can be very complex (Ripple et al. 1991), studies in the scientific literature have not clearly identified one measurement that shows direct effects on populations. This may be partly due to the many variables and population responses that operate over a long period of time (Lehmkuhl et al. 1991). In this analysis fragmentation of old-growth and mature timber patches will be based on the patch size of remaining blocks of forest, realizing that this is just one aspect of fragmentation (Robinson et al. 1992).

Biological corridors have many possible meanings and functions, but for this EIS the discussion of corridors is limited to functions that would likely be affected by proposed project activities. These corridors include riparian zones as well as strips of forest (either planned or unplanned) that connect larger blocks of old-growth and mature forest.

Corridors can be designed to reduce fragmentation of forest patches. Although little research exists in similar forested habitats to prove the value of corridors, considerable theoretical knowledge predicts their importance, and they have been proven effective in other ecosystems. Designed corridors, to be effective, must be wide enough to provide security as animals move between areas of forested habitat. Corridors also provide a link between forested areas to minimize the distance between fragmented populations of plants and sedentary animals, thus reducing genetic isolation. Poor quality corridors can have detrimental effects, such as reducing prey populations by concentrating predators (Stolzenburg 1991).

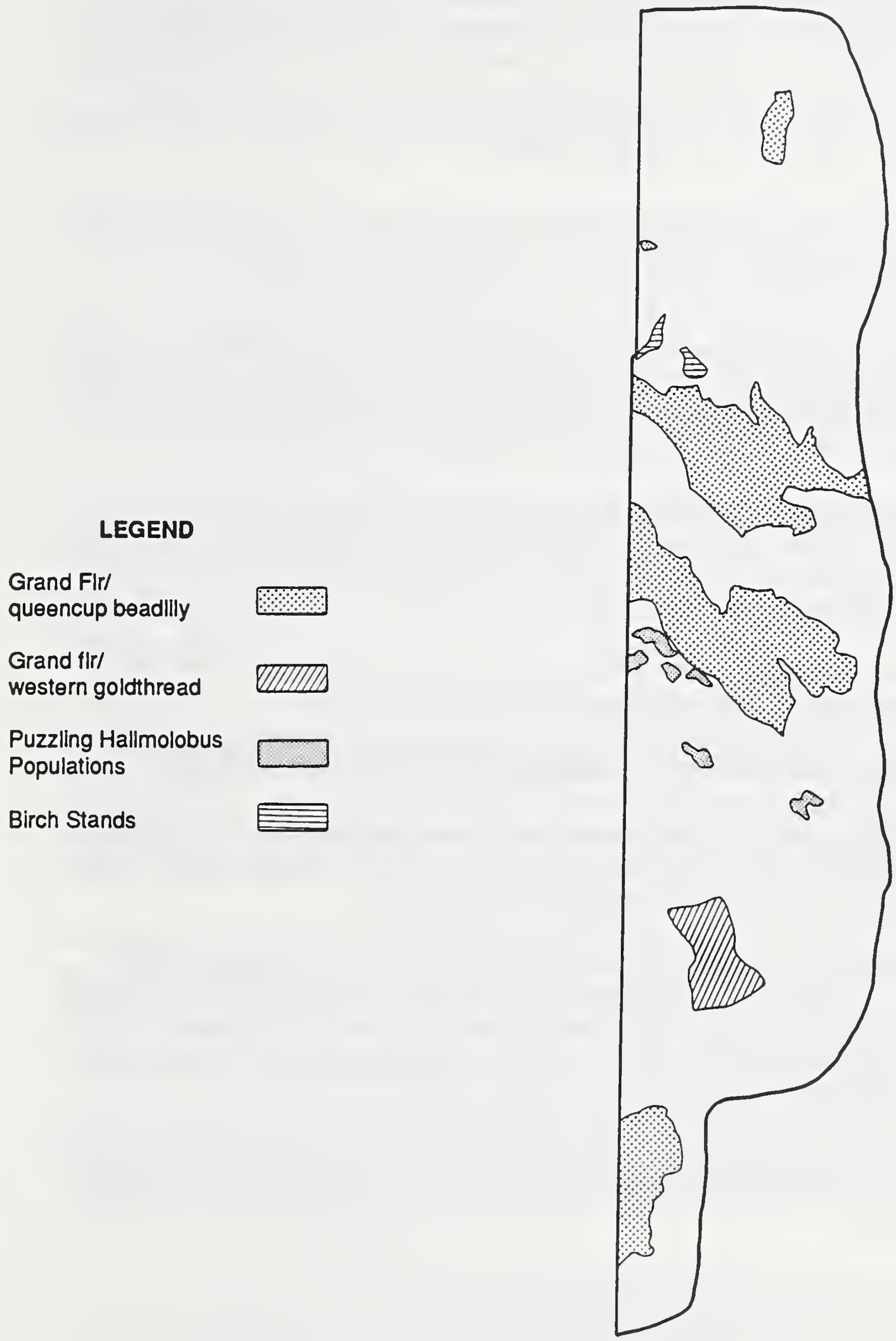
Currently, corridors of old growth/mature timber connect most of the planning area from north to south, as well as east to west along the major drainages.

VEGETATION TYPES AND SPECIAL HABITATS

This analysis looks at the existing vegetation types and their distribution pattern across the landscape. Vegetation types can indicate the suitability of a site for proposed management activities and reveal much about the environmental conditions of the site. Also considered is how common or uncommon these types are over the forest.

<u>Grand fir/mountain maple</u> habitat is the most common vegetation type in the planning area. This habitat indicates very productive timber-producing ground, but where fire or logging removes the overstory, tall shrubs persist for decades (Steele et. al. 1981). Another common

Figure 3-9. Uncommon and Special Habitats, and Sensitive Plant Populations in the Planning Area



type is Douglas-fir/ninebark on the warmer and dryer slopes. Ponderosa pine and Douglas-fir are the major tree species and the understory is dense shrubs. Again, shrub competition with tree regeneration can be substantial.

Special Habitats

The plant species most sensitive to management activities are likely to be those that occur where fire is not naturally a frequent event, and where a dense tree canopy has existed for many decades (Spies 1991). Special habitat types generally occur in the wetter habitat types in the drainages that flow into the main Salmon River and along the north edge of the Forest. These types are a southern extension of vegetation types more common in northern Idaho, and they contain plant species rare on the Payette Forest.

An unusual occurrence of paper birch was located along Hazard Creek (Figure 3-9). This tree is near the southern extent of its distribution here although common farther north in extreme northern Idaho. This species occurs in small stands or pockets near the creek.

The only habitat types in the planning area uncommon within the Payette Forest are: 1) grand fir/queen cup beadlily, which has a limited distribution along the western edge of the Forest although common in Idaho to the north, and 2) grand fir/western goldthread, which is incidental on the Payette Forest and common only on the Nez Perce Forest to the north.

Grand fir/queen cup beadlily occurs at mid-elevations on moist well-drained slopes. It is a highly productive habitat for plant and tree growth, and the understory is dominated by huckleberry and mountain maple. This habitat provides good cover and forage for big game and grouse (Figure 3-9).

Grand fir/western goldthread habitat is also a productive type for tree growth, but shrub growth is minor and little big-game browse is available (Figure 3-9).

THREATENED, ENDANGERED, AND SENSITIVE PLANT SPECIES

These species of plants need special consideration because their viability is considered at risk. The loss of a plant species directly reduces the biological diversity in an area, and may have indirect effects on the ecosystem that are impossible to predict.

No threatened or endangered plant species are known to occur in the Hazard Helicopter planning area. A botanist conducted surveys for sensitive plants in 1991. The only species found was puzzling halimolobus. This plant was found on a road cut, and along a southerly slope near a ridgeline (Figure 3-9). These locations are very hot, dry, and exposed situations with loose gravelly soils.

Other species searched for because of suitable habitat or nearby populations include: 1) candy stick, 2) Tweedy's reedgrass, and 3) out-of-tune sticky tofielda. None of these species were found in the area.

ENVIRONMENTAL EFFECTS

Effects of management alternatives on old growth, fragmentation, special habitats, and sensitive species strongly influence biological diversity and the species that make up forest ecosystems. In a cumulative sense, effects of various management alternatives throughout a watershed determine the sustainability of ecosystems. Evaluation of effects on ecosystems cannot always have standards and guidelines but must rely on the best professional judgement of resource specialists.

DIRECT AND INDIRECT EFFECTS

OLD GROWTH

Under all action alternatives, old-growth stands would be closer or adjacent to timber harvest activities. This would reduce the buffering effect of immature and mature timber, possibly changing the environmental conditions of these stands by modifying factors such as sunlight, wind, and humidity. The old-growth stands may be more threatened by blowdown and the invasion of edge-habitat species of plants and animals. Small stands could also lose some old-growth species and decrease their biological diversity.

On the other hand, the threat of catastrophic wildfires may decrease and allow old- growth stands to persist longer than they otherwise would.

All action alternatives would decrease stands of mature timber that are approaching old-growth condition.

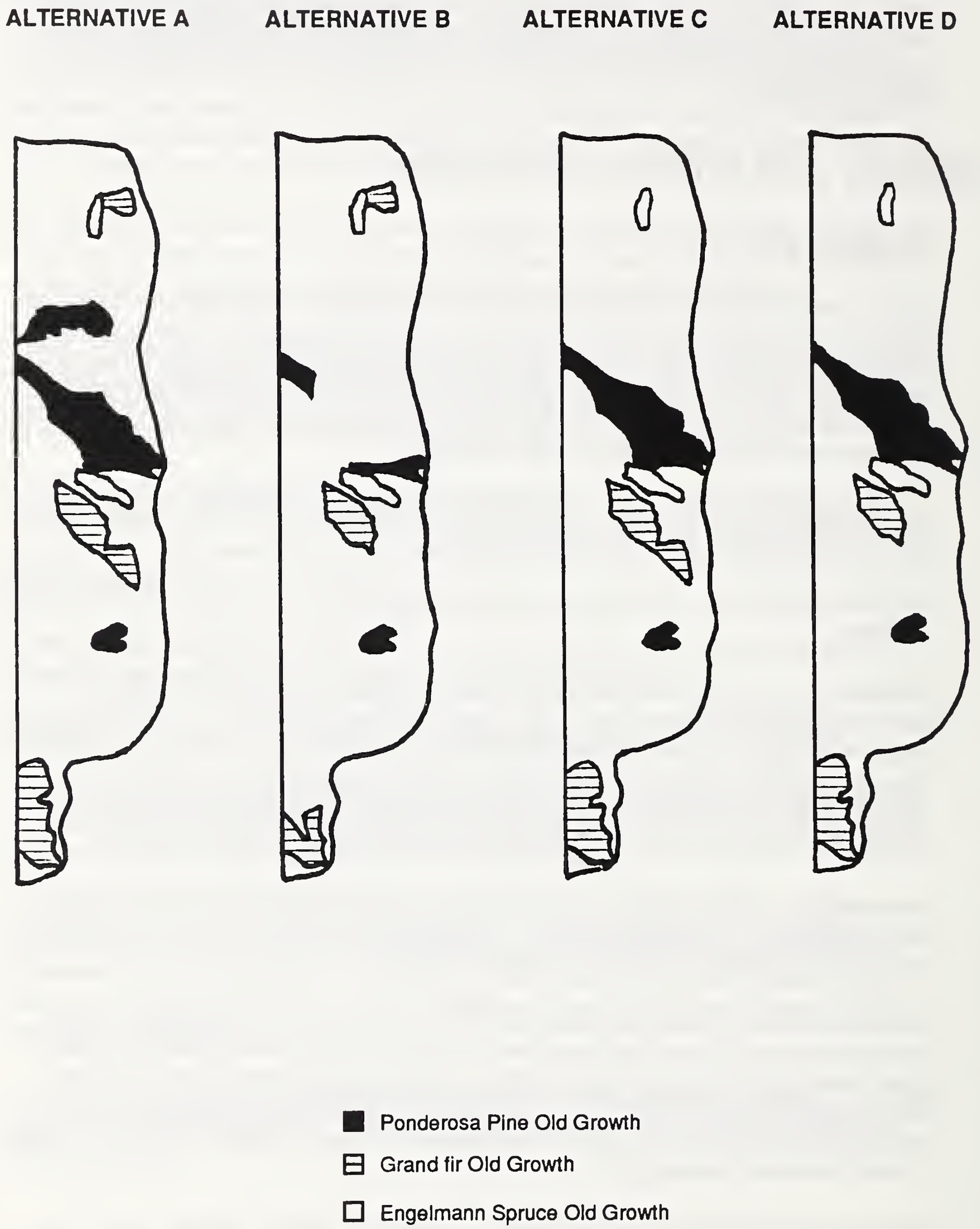
Alternative A - Old growth would not be greatly affected over the next 20 years under this alternative, but could increase from 17 to 18 percent of the planning area. It is possible that a large fire or insect or disease outbreak would destroy most or all of the stands, although this would be unlikely because of the distance between the stand farthest north and the stand farthest south. Also, because of the variety of tree species comprising the old growth, a disease or insect outbreak would be unlikely to occur over all stands simultaneously.

Alternative B - This alternative would reduce old growth by 394 acres; from 17 percent of the planning area to 8 percent of the area. This alternative would have the greatest reduction of old-growth habitat of all alternatives (Figure 3-10).

Harvest methods are primarily helicopter harvest with shelterwood 3 prescriptions. These prescriptions would remove the largest trees, leaving a younger forest. Some old- growth features would remain because of the relatively minor ground-disturbing impacts resulting from helicopter harvest methods. For example, snags and down logs would remain at relatively high levels initially, but snags would gradually decrease in density and down logs would increase in density as snags fall.

Remaining old growth not directly harvested would also be affected. Because many of the large blocks would be fragmented into smaller blocks, edge effects such as increased sunlight, wind, and evapotranspiration would decrease the quality of the remaining old-growth stands.

Figure 3-10. Remaining Old Growth in the Planning Area by Alternative



Some old-growth characteristics would be impacted within about 200 feet around the edge of these stands, leaving two patches with interior old-growth habitat, and nearly eliminating old growth from the south end of the planning area, except in narrow corridors along riparian areas.

Alternative C - Implementation of this alternative would reduce old growth by 70 acres; from 17 to 16 percent of the planning area. This would represent the smallest impact to old growth of any action alternative (Figure 3-10).

Most of the old growth mentioned above would be harvested by shelterwood prescriptions and helicopter methods similar to Alternative B. Approximately 33 acres would be a clearcut harvest which would remove nearly all old-growth features except for mitigation levels of snags, down logs and reserve trees. Remaining old growth would be most affected around that clearcut. Substantial amounts of old growth would remain in the central and southern portions of the planning area.

Alternative D - Under this alternative, old-growth habitat would decrease by 131 acres; from 17 to 14 percent of the planning area. This level of impact would be very low during this initial planning period (Figure 3-10).

The decrease of old-growth acres mentioned above would be in shelterwood and uneven-aged prescriptions, primarily uneven-aged. Uneven-aged harvest would have the least impact on the harvested stands of old growth of any prescription in any alternative during this initial entry (see Cumulative Effects discussion, below). This harvest would leave many of the overstory old-growth trees as well as most snags and down logs, but the stand could no longer be considered quality old growth because of the lower number of "trees per acre greater than 21 inches in diameter at breast height."

Remaining stands of old growth would also be less impacted by surrounding uneven-aged harvest prescriptions because increases in sunlight, wind and other environmental effects would be minor. Substantial amounts of interior old growth would remain in the north, central, and south parts of the planning area.

FRAGMENTATION AND BIOLOGICAL CORRIDORS

Under all action alternatives, fragmentation of old-growth/mature blocks of timber within the planning area would increase, and existing corridors would become smaller. The effects of this fragmentation would cause some wildlife species to modify their territories and home-range areas, and it would result in a loss of habitat for other species.

No conditions that would result in a loss of species viability or biological diversity within the planning area have been identified at this point for any of the action alternatives. A detailed analysis will be prepared in the biological evaluation and assessment for the preferred alternative in the Final EIS for this sale.

Alternative A - Five large blocks of mature/old-growth successional stage that are presently interior forest habitat and that serve as corridors in all parts of the planning area would continue to exist over the next 20 years under this alternative. Existing corridors would continue to allow free movement of animals and population interchange, unless impacted by a

major fire, or an insect or disease outbreak.

Alternative B - This alternative would leave one large 460-acre block of mature/old-growth forest relatively undisturbed, with only a lightly harvested sanitation salvage unit in part of the block. This block is located in the center of the planning area and extends from the eastern to western boundary, maintaining a corridor connecting the west side of Hazard Creek with the higher elevations above Morgan Lake. All other large blocks of old-growth/mature habitat would be fragmented by shelterwood units. Corridors would remain along Hazard Creek riparian zones.

Alternative C - This alternative would leave a large 970-acre block of habitat in the center of the area undisturbed, connecting the eastern and western edge of the planning area. Two other large blocks would also remain undisturbed at the south end of the area, one of 140 acres and one of 100 acres. Riparian corridors would remain undisturbed.

Alternative D - This alternative would fragment one block of mature/old-growth forest along Hazard Creek with shelterwood units. Uneven-aged harvest units in two of the four remaining blocks would reduce the quality of those blocks as interior forest habitat, but they would probably continue to function as habitat blocks and corridors much as at present.

VEGETATION TYPES AND SPECIAL HABITATS

Unusual vegetation habitat types may become reduced in acreage within planning area from land-disturbing activities such as landing construction. Timber harvest activities such as overstory removal, tree planting and prescribed burning may alter the natural mix of species characteristic of the habitat. No habitat will be lost from the planning area under any action alternative.

It is possible that botanical and biological surveys have not identified all special habitats that represent unique microsites where uncommon plant species are found. All alternatives present the risk of destroying these microsites through direct disturbance or indirectly through effects like altering herbivore or pollinator populations. Most likely of the indirect effects would be the creation of additional forage through overstory removal, resulting in increased populations of big-game or livestock use in a local area near a special habitat.

Alternative A - This alternative would not modify any uncommon habitat type, and succession would continue to occur in all habitat types, trending toward the climax old-growth species composition characteristic of each type. Early successional plants, especially shrubs, would become more shaded out by increasing canopy cover. Forage for deer, elk, and livestock would decrease, while an increase of huckleberry could improve forage for black bear and other species that feed on this shrub.

Alternative B - This alternative would shelterwood harvest about 44 percent of the uncommon grand fir/queencup beadlily habitat in the planning area. Overstory removal would reduce some plant populations characteristic of this habitat type, but the remaining 56 percent undisturbed habitat would provide a reservoir of the biodiversity associated with this habitat.

The other uncommon habitat in the planning area, grand fir/western goldthread, would be completely within a shelterwood harvest unit in this alternative. The overstory removal and

associated slash treatment would reduce populations of western goldthread and possibly other plants associated with this habitat. It is unknown if biodiversity would be in any way reduced, but the risk seems low because helicopter harvest would not greatly disturb the ground.

Alternative C - This alternative would shelterwood harvest on 9 percent of the uncommon grand fir/queencup beadlily habitat type in the analysis area. This level of impact seems unlikely to affect the biodiversity of the area. The grand fir/western goldthread habitat would not be harvested.

Alternative D - This alternative would harvest over 19 percent of the grand fir/queencup beadlily habitat type. Most of this harvest would be uneven-aged, which would leave most of the area unaffected.

All of the grand fir/western goldthread habitat would be harvested over under this alternative, but with an uneven-aged prescription. Again, uneven-aged harvest would leave most of the harvest area unaffected, and the risk to biodiversity seems slight.

Birch Stands

Birch stands along Hazard Creek would not be affected under Alternative A; and without any indication of conifer invasion at present, these stands would probably remain for many years under this alternative.

These stands would be within harvest units proposed for Alternatives B, C, and D. Alternatives B, C, and D would harvest these units with helicopter under a shelterwood prescription. Because these birch stands are noncommercial timber, they would not be directly harvested, but could be indirectly affected by harvest activities. Surrounding trees could be felled into these stands breaking a portion of the trees. Slash-burning activities could burn a portion of the stands, and conifer planting in the stands could convert them to conifer forest.

These disturbances would not likely destroy these stands in the short term, but could reduce the area of the stand. Then again, partial disturbance could stimulate birch reproduction, creating a younger age class and thus helping to perpetuate the stand over the long term. Mitigation will be prescribed to fall trees away from these stands where possible and to avoid planting conifers in them (see Mitigation Measures and Management Requirements, Chapter 2).

THREATENED, ENDANGERED, AND SENSITIVE PLANTS

There could be small populations of sensitive plants in the planning area that were not located during botanical surveys. These populations could be lost under any action alternative. This possibility is slight.

The possibility also exists that habitat may be created for some sensitive plant species, such as puzzling halimolobus, that inhabits disturbed areas or bare soil.

Alternative A and C would not affect any known sensitive plant population in the planning area.

Alternatives B and D would harvest over about 5 to 10 percent of the known puzzling halimolobus population in the area. Because the prescription is for sanitation salvage harvest by

helicopter, the impacts to the population would likely be slight. A biological evaluation will be prepared for this plant population for the preferred alternative in the Final EIS for this sale. Because this species prefers sunny open habitats of bare soil, harvest activities could actually create or improve habitat. The effects of road reconstruction and helicopter landing construction under any action alternative will also be analyzed in the biological evaluation.

CUMULATIVE EFFECTS

Biological diversity would not be cumulatively affected by any alternative over the landscape scale of analysis, because all species of plants occur in surrounding subwatersheds outside of the affected area and no alternative would change that. Since there are few planned timber sales immediately to the east, southeast, and northeast of the affected area, habitats in those directions are not likely to be impacted by management activities and would serve as a reservoir of species for most plant species in the area.

OLD GROWTH

All action alternatives would result in reduced distribution of old-growth patches over the affected subwatersheds. Populations of old-growth plants and animals will become less widely distributed over the subwatersheds, but will not be lost from a subwatershed under any alternative.

Over time, as a greater percentage of the subwatersheds become managed, old-growth stands will become fewer and more isolated. Remaining stands should become more secure from loss to fire.

FRAGMENTATION AND BIOLOGICAL CORRIDORS

The number of large unfragmented forest blocks will decrease and become smaller over time as planned timber sales are implemented in Management Area 11 along the Little Salmon River corridor from above Pinehurst to New Meadows on the Payette Forest.

VEGETATION TYPES AND SPECIAL HABITATS

Additional timber harvest within the subwatersheds in the future will increase the probability that special habitats are impacted by harvest-related activities. Uncommon plants associated with unique microsites may eventually disappear from the subwatersheds and decrease biological diversity; however, any plant species especially sensitive to harvest activities would likely be recognized as a sensitive species and receive appropriate protection.

Over time, Alternatives A and C appear to represent minor impacts to uncommon habitat types and biological diversity in the affected area. Alternative B could slightly reduce the biological diversity in the subwatersheds, depending on the presence and location of any other patches of grand fir/western goldthread habitat, which are unknown. Alternative D could eventually result in much of the drainage being managed by uneven-aged harvest, but this seems unlikely to impact habitat types within the subwatersheds.

THREATENED, ENDANGERED, AND SENSITIVE PLANTS

Over time, as a greater percentage of the subwatersheds become harvested, the probability of disturbance to populations of sensitive plants becomes greater.

The puzzling halimolobus population in this planning area is the largest population that has been found on the Forest. Because only a few, smaller populations have been found in the Little Salmon River and Salmon River drainages, all populations are important to population viability of this species; loss of any population could affect the population viability of the Hazard Creek population. About 30 major timber sales are planned from 1993 to 1998 in these drainages on the Payette Forest; in addition, several cattle and sheep allotments exist in these areas. Surveys for puzzling halimolobus will be conducted for each of these actions and biological evaluations will be prepared.

The closest known population to the Hazard Creek population is about 4 miles west in the North Round Valley timber sale area. A biological evaluation has been completed for that population (Lockwood FEIS 1993). That evaluation for timber sale activities found road building, livestock grazing, timber harvest activities, noxious weed control, fire-fighting activities, prescribed burns, trail and road maintenance, and off road vehicles among the possible threats to this species.

Although none of these potential impacts appear to threaten the Hazard Creek population in any proposed alternative, about 60 percent of this population occurs on private property near the western boundary of the planning area. Any or all of these impacts could occur on that property in the future, but no alternative proposed by this project would either increase or decrease the potential of those impacts from occurring. A biological evaluation will be prepared to analyze the effects of the preferred alternative on the viability of this species.

FOREST PLAN CONSISTENCY

All alternatives would be consistent with the Forest Plan regarding these resource effects.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

No irreversible and irretrievable commitment of resources would occur as a result of any proposed alternative.

Timber

Issue: The need to treat timber stands in order to improve health and vigor and to meet future growth and productivity projections made in the Payette Forest Plan.

Indicators:
- **Acres Treated**
- **Percent of acres treated in relation to suited acres needing treatment**
- **Timber Volume Harvested**

Issue: The type of silvicultural system or systems used to manage timber stands and the type of logging methods used in harvesting.

Indicators:
- **Acres by cutting method**
- **Acres by logging method**

Issue: The growth, health, and vigor of timber stands. This issue includes impacts from insects and disease, the salvage of dead and dying timber, and regeneration.

Indicators:
- **Stand growth as a percent of site potential**
- **Acres by regeneration method**

FOREST PLAN DIRECTION

The planning area south of Hazard Creek is in Management Area 10. Forest Plan direction for timber here is to manage timber extensively by use of helicopter. Provide for salvage of dead, dying and high-risk trees for firewood and other wood products. Stocking control may be done when consistent with other resource management objectives. No new road construction will be allowed (page IV-251).

The planning area north of Hazard Creek is in Management Area 11. Manage suited timber acres to near site potential to produce commercial crops of trees suitable for sawtimber and other wood products (page IV-50). Manage timber by use of helicopter in areas where helicopter logging is determined to be the most appropriate method to meet management objectives (page IV-208).

DESIRED FUTURE CONDITION

In Management Area 11, timber management intensity will be high. The majority of the overmature stands will be converted to vigorous, young stands during the next 50 to 80 years (page IV-50).

In Management Area 10, extensive timber management will be used to improve the health and vigor of the stands and to salvage dead, dying, and high-risk trees.

AFFECTED AREAS

The timber resource in the harvest units may be directly affected. The planning area may be indirectly affected. The area that may be cumulatively affected is the suited timber land within the roadless area and the Payette Forest planning goals, targets and suited timber base.

AFFECTED ENVIRONMENT

Inventories taken on the suited timberlands in the planning area provide data on species, size, and condition of the trees making up the stands. These data were compiled into computer data bases and a Geographic Information System (GIS) to allow quick retrieval and analysis. Detailed stand information is available in the planning records at the Supervisor's Office in McCall, Idaho.

Mixed conifer stands occupy most of the Hazard Helicopter planning area. Ponderosa pine and Douglas-fir dominate the stands at lower elevations and on southern exposures. As elevations increase or exposures become more northerly, western larch, grand fir, lodgepole pine, and subalpine fir make up more of the stand structure. On moist to wet sites, Engelmann spruce may dominate, although the spruce beetle has killed many of the larger trees in recent years. Most of the stands are on moderate to highly productive sites. Brush, forbs, and grasses make up the understory vegetation.

Most of the planning area is roadless and has never been harvested. Much of this roadless area occurs on steep ground and would require helicopter logging methods. The mixed conifer stands are composed mostly of large ponderosa pine and Douglas-fir trees, with a mixed pole to immature sawtimber understory of ponderosa pine, Douglas-fir, and grand fir. Without treatment, the shade-tolerant grand fir will slowly take over many of the stands.

SUITED ACRES

Managing suited timber acres is a basic goal of the Forest Plan (IV-50). Silvicultural treatments, including harvest, are designed to provide for stand health and vigor and to improve growth toward site potential. Acres currently available for treatment depend upon stand age, health, density, juxtaposition with previously harvested stands, accessibility, and other resource considerations.

Stands within the planning area were analyzed for suitability for timber management using the five criteria outlined in the Forest Plan (page VI-44). The criteria are listed in bold below, followed by the rationale for planning area suitability.

1. **Land has not been withdrawn by Congress, the Secretary of Agriculture, or Chief of the Forest Service.** None of the land within this sale planning area has been withdrawn.

2. **Technology is available to prevent irreversible damage to soils, productivity, or watershed conditions.** For the areas proposed for harvest, technology is available to prevent irreversible damage.

3. **There is reasonable assurance that lands can be adequately restocked within 5 years after final harvest based on existing technology and knowledge.** All of the stands proposed for harvest are on sites and habitat types similar to areas that have regenerated successfully on the Payette Forest.

4. **There is at present, adequate information of responses to timber management activities.** The units planned for timber management are similar to Payette Forest land currently under successful management.

5. **Timber management is consistent with, and cost-efficient in meeting the management requirements and multiple-use objectives specified in the Forest Plan.** The planning area can be managed efficiently (see Economic section in this chapter), as specified in the Forest Plan.

There are approximately 2,600 tentatively suited acres in the Hazard Helicopter planning area. Approximately 200 acres have been previously treated and 300 acres are currently in good condition, leaving 2,100 acres currently available for some type of treatment.

The stands in the area are composed of the following timber types: 87 percent of the area is Mixed Conifer, 3 percent is Subalpine Fir, and 1 percent is Engelmann Spruce type, with 9 percent non-forest. Additional stand information and maps are available for review at the New Meadows Ranger District Office. The following table summarizes some of the stand inventory data for the Hazard Helicopter planning area.

Table 3-6. Percent of the Timber Type Volume by Species in the Planning Area

Timber Type	% Vol. Ponderosa Pine	% Vol. Douglas Fir	% Vol. Western Larch	% Vol. Engel. Spruce	% Vol. Lodgep. Pine	% Vol. Grand Fir	%Vol. Subalp. Fir
Mixed Conifer	29	11	3	10	1	45	1
Subalpine Fir	0	3	6	35	12	36	8
Engelmann Spruce	0	6	0	73	0	21	0

The area south of Hazard Creek is in Management Area 10, described in the Forest Plan beginning on page IV-247. Timber in this area will only be managed extensively using helicopter logging methods. Maximizing sawtimber growth is not a direct objective in the area. The desired future condition is to improve the health and vigor of the treated stands. The action alternatives would begin this process by removing some dead, dying, and high-risk trees.

The area north of Hazard creek is in Management Area 11 and suited timber stands are to be managed intensively. See Forest Plan, page IV-203, for more information.

SILVICULTURAL AND LOGGING SYSTEMS

Most natural timber stands in the planning area are essentially even-aged and have developed a one- or two-storied structure. Irregularities occur as the stands age and move through various stages of succession until natural events, such as wildfire, windstorms, or insects and diseases begin a new stand. Even-aged management systems—clearcutting, seed tree cutting, and shelterwood cutting—attempt to emulate the natural seral stand structure while controlling conditions that cause slow growth and mortality.

Clearcutting has received increased public attention in recent years, primarily because of the

dramatic visual changes after harvest. Some people have suggested uneven-aged management as a solution to the clearcutting controversy. Uneven-aged management has some definite advantages when managing shade-tolerant or climax tree species and in areas where recreation and visual quality are overriding considerations. Uneven-aged management systems (individual tree or small group selection cuts) manipulate the forest for a continuous forest overstory, recurring regeneration of desirable species, and orderly growth and development of trees through a range of age or diameter classes.

In developing the Forest Plan, uneven-aged management systems were analyzed. The analysis indicated that uneven-aged management generally should be limited to wet spruce areas, dry ponderosa pine and Douglas-fir habitat types, fragile slopes, and visually sensitive areas (page IV-63). Most of the other natural stands on the Forest have a generally even-aged structure and are composed of older trees. Converting these stands to an uneven-aged structure would be difficult, costly, and would not emulate natural processes.

For more information on silvicultural prescriptions and their consequences, see Appendix G in this document. **This appendix is critical to understanding timber consequences.**

The northern portion of the planning area is roaded and some stands have been recently harvested in the Hazard-Tepee sale. At least 4 sales have occurred in that area using sanitation/salvage, clearcut, and shelterwood prescriptions to harvest about 150 acres. The older clearcut and shelterwood harvest units are generally well stocked with ponderosa pine, Douglas-fir, and western larch and are growing rapidly.

SITE POTENTIAL AND GROWTH AND YIELD

Timber stands have an inherent potential to grow vegetation at certain rates. The rate depends on many physical characteristics, such as soils, aspect, elevation, and available moisture. Tree growth in natural stands is often below the site potential because of competing vegetation (grass, brush, or too many trees), poor stocking, age, decay, and mortality. Growth and health can often be increased by planting selected tree species, reducing competition from grasses and brush, thinning overstocked stands, reducing damage from animals, insects, and disease, salvaging mortality, and harvesting stands that have passed optimum growth rates.

Because Forest Plan direction for Management Area 10 is for extensive rather than intensive timber management, maximizing sawtimber growth is not a major objective. Healthy stands, however, where mortality does not exceed growth, is part of the implied desired future condition for the area. A positive growth rate of 44 percent of site potential would meet this DFC. Currently, the stands are growing at about -72 percent of site potential. This means that mortality and decay are taking place faster than new growth is occurring. Without harvest, this condition will continue until wildfire rejuvenates the stands. Salvage of dead, dying, and high-risk trees is part of the management direction for the area (Forest Plan, IV-251). More information on potential growth and yield can be found in the planning records.

Regeneration Methods

The National Forest Management Act requires that harvested areas be reforested within 5 years of a regeneration cut. Timber stands on the Payette Forest are regenerated by both planting and natural reproduction. The method selected is often determined by the access to the area, availability of an adequate seed source, cutting method used, the cost, and the planned

management intensity. Due to the extensive management direction for the Hazard Helicopter sale, most of the reforestation would be by natural regeneration.

Natural regeneration often occurs at irregular intervals because it depends on good seed crops and weather. Natural reproduction is generally cheaper than planting if the existing tree species, age, and condition are suitable for adequate seed production. The stand finally produced from natural seeding may or may not compare favorably in composition or density to one created by planting. Where obtaining maximum growth rates is not a primary objective, natural regeneration is often desirable. Currently in the planning area, small openings created by fire or windthrow are regenerating naturally.

Planted stands can be managed more efficiently and may yield greater volumes and values than naturally regenerated stands. Planting has a relatively high initial cost and takes many years before it gives a return on the investment. From 1978 through 1990, the Payette Forest plantation success rate averaged 97.4 percent (Payette National Forest, 1991). Examples of desired plantation survival and growth can be seen on past harvest units along the Tepee Springs road to the north and the Fourmile area south of the Hazard Helicopter sale.

ENVIRONMENTAL EFFECTS

Since 1897, the National Forests have been required to "furnish a continuous supply of timber for the use and necessities of citizens of the United States" (16 U.S.C. 475). The concept of sustained yield was written into law in the 1960 Multiple Use Sustained Yield Act. It was expanded upon in the 1976 National Forest Management Act that guides forest planning. Sustained yield means "the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the National Forest System without impairment of the productivity of the land." The action alternatives would, to various degrees, meet this intent.

In Alternative A, No Action, timber stands would continue to move through successional stages towards climax species. Seral species would slowly be replaced by more tolerant, less commercially valuable species, such as grand fir and subalpine fir. Old and stressed trees would continue to die. As the stands age without harvest or fire, insects and diseases would increase, and stand growth and vigor would decline. Eventually, the stands would burn in a wildfire and return to a more open, early seral condition.

The action alternatives would move towards the desired future condition for suited timber stands in the Hazard Helicopter planning area. Chapter IV of the Forest Plan Final EIS describes the consequences of timber harvest to timber and other resources on a Forestwide scale and is herein incorporated by reference. The discussion in this section focuses on the consequences of the alternatives and their effect on the desired future condition of the timber resource in the planning area.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

SUITED ACRES

Acres Treated

Alternative A would defer this sale for the rest of the planning period and no acres would be treated. When the Forest Plan is revised, the area would be re-analyzed for timber suitability and other management options. A wildfire, insect epidemic, or other catastrophic event could prompt a salvage project analysis prior to a Forest Plan revision.

The following table shows the suited acres proposed for harvest by alternative for the Hazard Helicopter sale.

Table 3-7. Total Treated Acres by Alternative

	A	B	C	D
Total Treated Acres	0	836	205	555

In **Alternative B** (the original sale proposal), the 836 suited acres treated are 39 percent of the acres currently available for treatment. Since most of the planning area is scheduled for extensive management, the number of management entries will be fewer than in intensively managed stands. Treating more stands when management is scheduled will greatly reduce mortality and enhance the health and vigor of those stands.

Alternative C would harvest about 205 acres or 10 percent of the suited stands in the area. Management of the suited timber lands in the Hard Creek drainage would be deferred at this time. These untreated stands would continue to lose seral vegetation. Overstocking would occur in some stands, increasing competition for moisture and sunlight and increasing mortality from insects and disease.

Alternative D would harvest 336 acres (16 percent) of the suited acres in the sale area. The difference between treated acres in Table 1 and the harvest acres is due to the acres treated using uneven-aged management. For uneven-aged management, only about 30 percent of the treated unit is actually cut. The uncut portions of the stands will continue to decline in health and vigor until other entries bring the total stand under management. This may take 80 to 100 years, depending upon the future re-entry schedule.

Acres Treated in Relation to Suited Acres in Need of Treatment

The following table shows the percent of treated acres by alternative as compared to the acres available for treatment in the Hazard Helicopter area.

Table 3-8. Percent of Suited Acres Proposed for Harvest by Alternative

	A	B	C	D
Percent Suited Acres	0	39	10	16

Timber Volume Harvested

In **Alternative A,** no volume would be harvested from the area at this time. The planned volume would not be replaced by other roaded sale volume.

In **Alternative B,** approximately 7.1 MMBF would be harvested during this entry from the Hazard and Hard Creek drainages.

In **Alternative C,** harvest of 2.4 MMBF would only take place within the Hazard Creek drainage portion of the planning area. No harvest would occur in the Hard Creek drainage.

Alternative D would harvest 3.0 MMBF from both drainages.

SILVICULTURAL AND LOGGING SYSTEMS

Cutting Methods

SW3 (Shelterwood 3) prescriptions are used in all action alternatives for this project. SW3 prescriptions (also called overstory removals) are designed to reduce competition to the younger understory by removing taller, older, and high-risk trees. This harvest is not designed to promote new regeneration because adequate stocking is already present in the understory.

In the Hazard Helicopter area, the understory often consists of poles and immature-sized sawtimber. With the SW3 prescription, few new openings would be created, and the majority of those would be well under an acre in size. Regardless of the size of the harvest unit, this prescription would not exceed theForest Plan harvest opening limit of 40 acres. See Appendix G for more discussion of silvicultural systems.

No cutting methods would be used in **Alternative A** (No Action).

Alternative B, the proposed action, would manage the stands using SW3 and sanitation salvage prescriptions. It would create a mosaic of age classes and successional stages between the stands. No clearcutting would be used. See Figure 2-2 for cutting unit prescriptions and existing road locations.

In **Alternative C,** most of the units would receive an overstory removal cut (SW3). Only one 33-acre clearcut is prescribed. See Figure 2-3 for cutting unit prescriptions and road locations.

Alternative D utilizes mostly uneven-aged prescriptions that would harvest individual trees and groups of trees, creating openings less than 2 acres in size. Two units would remove some of the overstory trees (SW3) to release the existing understory. One sanitation salvage prescription is also prescribed. This alternative would create a mixture of age classes and seral

stages within the stands. The small openings would allow better forage utilization by wildlife. See Figure 2-4 for cutting unit prescriptions and road locations.

The following table shows the silvicultural prescriptions used in the alternatives for the Hazard Helicopter sale.

Table 3-9. Acres Treated by Cutting Method by Alternative

Cutting Method	A	B	C	D
Clearcut/Seedtree	0	0	33	0
Shelterwood	0	734	172	63
Sanitation/Salvage	0	102	0	102
Uneven-aged	0	0	0	390
TOTAL ACRES	0	836	205	555

Logging Methods

Alternative A, No Action, would not use any logging methods. **Alternatives B, C, and D** would all use helicopter logging methods, as directed in the Forest Plan for Management Area 10. All logging would be by helicopter due to the access management restrictions for Management Area 10 and other resource concerns in Management Area 11 (steep slopes, visual quality, along stream segment of concern).

SITE POTENTIAL AND GROWTH AND YIELD

Alternative A would defer harvest at this time. Stand health and vigor would not improve over current conditions. The current growth in the area is -72 percent of site potential. This means that mortality and decay are taking place faster than new growth is occurring. Without harvest, this condition will continue until wildfire rejuvenates the stands.

Alternative B would capture some of the potential mortality (salvage harvest high-risk trees) on 836 treated acres. Removal of some of the high-risk, slow-growing overstory trees would release younger trees so that future growth would improve to about -18 percent of the site potential. This improvement in growth would lead to healthier stands. This alternative does the most to reverse the current negative growth trend. Because stocking is for the most part adequate, and the management direction for the area is extensive, no planting is proposed for this alternative.

Growth in **Alternative C** would improve over current conditions (Alternative A) but only to -61 percent. This alternative proposes one clearcut unit which would be planted with ponderosa pine, Douglas-fir, and western larch seedlings. The other SW3 units are already adequately stocked with younger trees which will be retained. Removal of some of the overstory trees will reduce mortality and give the younger trees room to grow. The stands in the Hard Creek drainage will not be treated in this alternative, and mortality and negative growth will continue there.

Alternative D would reduce some of the potential mortality and control stocking in portions of the harvest units, so growth would improve slightly. Negative growth (-50 percent) would continue to occur over the area. Harvested stands would be regenerated by planting 78 acres with desired seral species (ponderosa pine, Douglas-fir, and western larch). Natural regeneration on 39 acres would result in an unknown species mix but would probably contain a significant percentage of grand fir. Because most of the harvest uses uneven-aged prescriptions, it would take several more entries to bring about positive growth rates.

The following table shows the Forest Plan long-term projection and growth rates by alternative as a percent of site potential for the Hazard Helicopter sale. The long-term DFC for suited timber stands in the area is 44 percent of site potential. Several more entries will be required to improve the growth toward the desired future condition.

Table 3-10. Growth as a Percent of Site Potential by Alternative

	Forest Plan	Alt. A	Alt. B	Alt. C	Alt. D
Growth Percent	44	-72	-18	-61	-50

Regeneration Methods

No planting would occur in **Alternatives A and B**. Some natural regeneration would occur over time but would not be a direct result of either alternative.

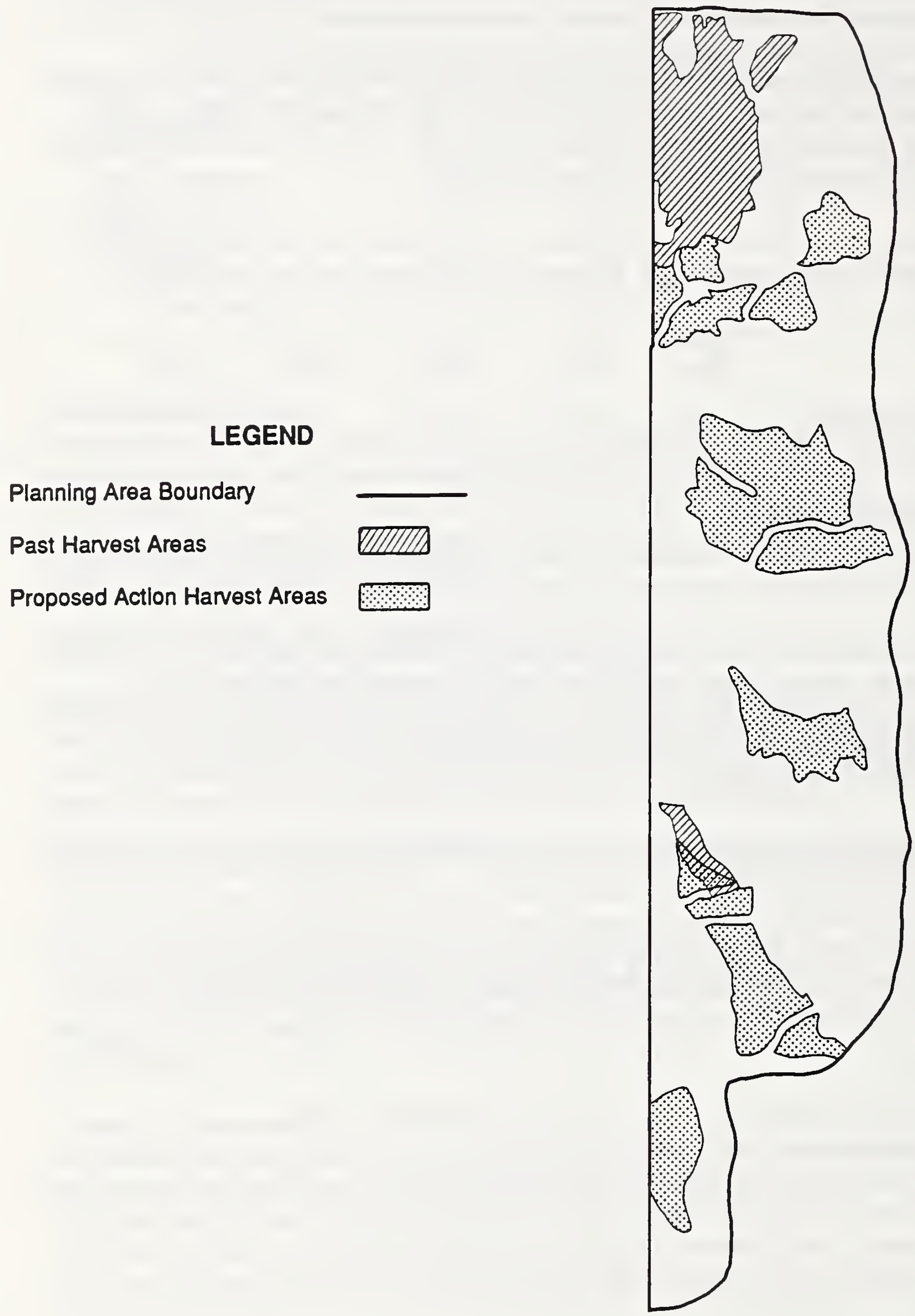
Part of the revenues (KV) generated by the sale would finance stand improvements including planting in some **Alternatives C and D**. This would provide the desired species mix of ponderosa pine, Douglas-fir, and western larch and produce stocking levels for healthy stands. No precommercial thinnings are prescribed in these stands due to the extensive nature of timber management in this area.

The following table shows the acres of planting and natural regeneration planned by alternative for the Hazard Helicopter sale.

Table 3-11. Planting and Natural Regeneration Acres by Alternative

Treatment	A	B	C	D
Planting Acres	0	0	38	78
Natural Regeneration Acres	0	0	0	39

Figure 3-11. Past Harvest Locations and Proposed Action Harvest Locations in the Planning Area



CUMULATIVE EFFECTS

SUITED ACRES

Past, proposed, and future treatments will eventually bring suited timber stands in the planning area under extensive management. Past sales have treated about 400 acres, mostly in the northern portion of the planning area. Action alternatives proposed for this sale would treat between 205 and 836 additional acres. It is also probable that future treatments will continue to manage these stands for health, with sawtimber production a by-product of this management. Subsequent re-entries will likely be farther apart than in areas of intensive management. Volume will continue to come mostly from mortality, high-risk, and slow-growing trees. With each management entry, the stands in the Hazard Helicopter area will continue to move toward the desired future condition as outlined in the Forest Plan for Management Area 10. See Figure 3-11 for previous and proposed action harvest locations.

In the next seven years there are 10 sales proposed in the French Creek/Patrick Butte Roadless Area. This includes the Hazard Helicopter sale. The cumulative amount of timber harvested will depend upon the alternative selected for each sale and could range from 0 to 70 MMBF. The number of suited acres treated will also depend on the alternatives selected for these sales. Cumulatively, these sales could have a significant effect on the Payette Forest ASQ, as well as on stand growth, health, and contribution to the local economy.

SILVICULTURAL AND LOGGING SYSTEMS

There are some stands along the existing roads in Hazard and Hard creeks which have been harvested in the past. Partial cuts were used in Management Area 10, while clearcuts and shelterwood harvests were used along the Tepee Springs road. These types of silvicultural systems are proposed in the EIS, and are likely to be used in the future. It is anticipated that some form of extensive management will continue to be used (often shelterwood or uneven-aged harvests relying on natural regeneration) within Management Area 10.

Tractor logging was used exclusively in the past. Current Forest Plan direction is to use helicopter logging systems in Management Area 10, and it is expected that this will continue to be required in the future. A variety of logging systems may be used in Management Area 11, north of Hazard Creek.

SITE POTENTIAL AND GROWTH AND YIELD

Past harvests were mostly limited to the very northern portion of the planning area. For most of the area, active fire-control practices and limited harvest have allowed stands to age and move toward a more climax condition. The result is current growth rate averaging -72 percent of site potential.

As stands are treated, health and vigor, as well as growth, will improve over current conditions (see Table T-4). The Forest Plan proposed action (Alternative B) would improve the current growth situation to -18 percent. Alternatives C and D, which treat fewer acres, would allow more mortality and slow growth. Forest Plan objectives for growth would not be met in this planning period if Alternative A, C, or D is selected.

Future entries would continue to improve the growth situation. The speed at which the DFC (44 percent of site potential) would be met depends upon the number of acres treated in future entries and the prescriptions used. Following Forest Plan projections, it is estimated that about three more entries would bring stands close to the desired future condition.

FOREST PLAN CONSISTENCY

Alternatives A, C, and D would not move the timber stands toward the desired future condition as quickly as anticipated in the Plan. These alternatives do not do as well as Alternative B in providing for salvage of dead, dying and high-risk trees as directed for Management Area 10 (Forest Plan, page IV-251).

The use of uneven-aged prescriptions in Alternative D would not meet Forest Plan direction that states, "With the exception of the riparian areas, wet spruce stands, and the dry ponderosa pine and Douglas-fir habitat types, the Payette National Forest will favor the even-aged system of management" (Forest Plan, page IV-58).

All action alternatives are consistent with the extensive timber management objectives in the Forest Plan.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

Timber and vegetation are renewable resources and can be managed for many desired attributes. Where forest changes are measured in decades to hundreds of years, harvest of the timber resource is not an irreversible or irretrievable commitment of the resource. Alternative A, No Action, would defer management of the suited timber acres. Substantial sawtimber volume would be irretrievably lost because of slower growth, decay, and mortality.

Extensive timber management will promote healthier stands but will not produce the potential growth that the sites are capable of growing. This potential growth will be irretrievably lost.

Alternative D, which uses mostly uneven-aged cutting methods, would achieve potential growth more slowly than Alternative B, which uses mostly even-aged cutting methods. The difference in growth would be an irretrievable loss.

Roads and log landings are an irretrievable commitment of these areas from timber production. (See the SOILS section for a discussion of the acres of total soil resource commitment.)

Wildlife Habitat

Issue: The effects of the proposed sale on special wildlife habitats in the planning area and the biological diversity they represent.

Indicators:
- **Effects on special wildlife habitats**
- **Effects on wildlife biological diversity**

Issue: The effects of the proposed sale on the habitats of Management Indicator Species.

Indicators:
- **Effects on Rocky Mountain elk habitat (EHE rating)**
- **Effects on pileated woodpecker habitat**
- **Effects on Williamson's sapsucker habitat**
- **Effects on vesper sparrow habitat**

Issue: The effects of the proposed sale on the habitats of threatened, endangered and sensitive wildlife species.

Indicators:
- **Effects on threatened and endangered species habitats**
- **Effects on sensitive species habitats**

FOREST PLAN DIRECTION

Provide a diversity of habitat to support viable populations of all native vertebrate species. Manage threatened and endangered species habitat consistent with recovery plan objectives. Provide elk habitat capable of sustaining or increasing elk populations. Manage pileated woodpecker, Williamson's sapsucker, and vesper sparrow habitat capability to provide for viable populations to achieve the goals for these Management Indicator Species (page IV-25).

DESIRED FUTURE CONDITION

Populations of Management Indicator Species should remain fairly stable throughout time. Populations of elk and Williamson's sapsucker will remain static as their habitats remain static. Vesper sparrow habitat and populations should show a slight increase from current levels. Pileated woodpecker habitat will continue to decrease. However, because there is currently an abundance of unused habitat, the pileated population is expected to remain static through 2030 (Forest Plan, page IV-25).

AFFECTED AREAS

For special wildlife habitats and biological diversity, the directly and indirectly affected area is the planning area. The cumulatively affected area includes the Hazard and Lower Hard Creek subwatersheds, and the adjoining subwatersheds to the north and south (Figure 3-7).

For Management Indicator Species, the directly and indirectly affected areas are Issue Reporting Area 358 and the planning area. The cumulatively affected area is Elk Management Unit 11 (Figure 3-12).

For Threatened, Endangered, and Sensitive species, the directly and indirectly affected area is the planning area. The cumulatively affected area for the Peregrine Falcon is anywhere within 15 miles of a known nest site. For other species the cumulatively affected area includes the Hazard and Lower Hard Creek subwatersheds, and the adjoining subwatersheds to the north and south (Figure 3-7).

AFFECTED ENVIRONMENT

BIOLOGICAL DIVERSITY

A variety of wildlife habitats occur in the planning area due to the wide range of environmental conditions, elevations that range from 3,600 to 6,600 feet, and the effects of past timber harvest activities. Along steep south-facing ridges above Hazard and Hard Creeks, brush and rocky hillsides have only scattered tree cover. Along the eastern edge of the area, open subalpine meadows extend from 5,800 feet up to above 8,000 feet a mile further east. Old-growth spruce stands occur along the east edge of the planning area, and old-growth ponderosa pine stands occur west of Hazard Creek. Riparian zones occur throughout the area.

Under the Forest Dynamics and Biological Diversity sections of this chapter, forest habitat types, successional stages, and patch dynamics across the landscape were examined. Another way of looking at the land is by wildlife habitats; that is, habitats with environmental features that are important to certain wildlife species. Most common wildlife species are adapted to a wide range of conditions in these general forest habitats. Impacts to these general habitats are analyzed through Management Indicator Species in this section.

SPECIAL WILDLIFE HABITATS

Within the general forest habitats mentioned above are specialized habitats and conditions that are less commonly found throughout the Payette National Forest. The presence of special habitats in an area contributes greatly to biological diversity by providing niches for certain animal species not found in the general forest. These special habitats may be relatively common across the Forest, but are small in area and/or especially sensitive to disturbance.

Maintaining, improving, or increasing the representation of special habitats at some level is necessary to maintaining biological diversity as it presently exists within the planning area. Special wildlife habitats in the planning area include:

- **South-facing Brush Field -** 4 percent of the planning area; dense shrubs of choke cherry, mountain maple, and ocean spray.

- **Old Growth Spruce -** 2 percent of the planning area; large spruce and grand fir trees with a sparse understory of moist-soil shrubs and forbs.

- **Old Growth Ponderosa Pine -** 10 percent of the planning area; large, widely spaced ponderosa pine trees with understory of pine grass, ocean spray, and ninebark.

- **Riparian Zones -** 2 percent of the planning area; streamside vegetation with spruce, alder, and false hellebore.

- **Talus Slope -** 1 percent of the planning area; loose rocky slope with little or no vegetation.

MANAGEMENT INDICATOR SPECIES

Species abundance, distribution, and habitat requirements are unknown for many species on the forest, and for some species little is known by science. For this reason, MIS (Management Indicator Species) have been selected to represent a wide range of conditions and habitats on the forest. The Forest Plan provides some guidelines for the management of habitats to maintain these species.

Rocky Mountain Elk

The Forest delineated 23 EMUs (Elk Management Units) in the Forest Plan to help analyze the effects of proposed management activities on elk. EMUs are designed to follow geographical land features (e.g. ridgelines, watersheds) and to include potential elk home ranges. EMUs are further broken down into IRAs (Issue Reporting Areas).

The Forest Plan established a minimum EHE (Elk Habitat Effectiveness) rating for each IRA and EMU to indicate whether the elk habitat objective of providing habitat capable of sustaining or increasing elk populations was met. These ratings are calculated through the West-Central Idaho EHE model (Idaho Department of Fish and Game, et al. 1983), which rates perfect elk habitat at 100 percent.

The primary habitat factors considered by the model include open road miles, relative road impacts, cover-forage ratios and the relative position of forage and cover. The projected EHE ratings are different for each alternative depending on acres and position of harvest units and miles of road constructed. The EHE ratios also vary during each year of the sale as impact factors (roads and cover) change.

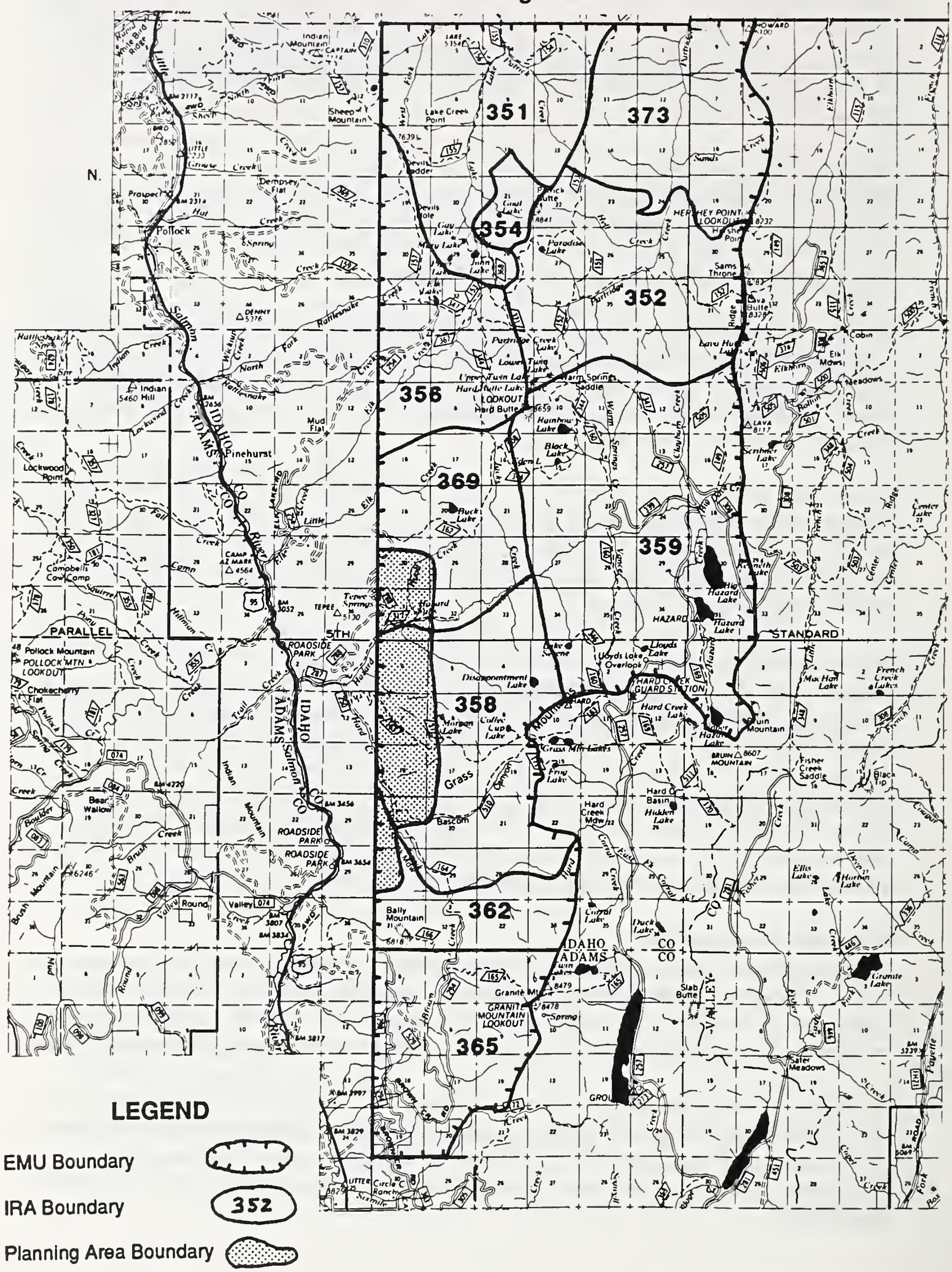
Elk are common spring, summer, and fall residents of the planning area. Elk (and deer) likely migrate a short distance north to winter along the Main Salmon and Little Salmon Rivers. In general, elk habitat conditions are good, with a variety of forage and hiding cover. Most of the planning area is in IRA 358, which includes additional land to the east (Figure 3-12). About 15 percent of the planning area is in IRA 369, which extends to the north of the area, and only one percent of the planning area is in IRA 362, which extends to the south. Road density in all of these IRAs is currently very low. For IRA 358, the Forest Plan EHE goal is 90 and the current rating is 97. For IRA 369, the Forest Plan goal is 70 and the current rating is 95. For IRA 362, the Forest Plan goal is 85 and the current rating is 90.

Pileated Woodpecker

The pileated woodpecker represents wildlife associated with multi-canopy, old-growth forests and mature forests that provide large trees, snags, large down logs, and stumps for foraging, perch sites, nesting and roost cavities (Forest Plan, page II-27). Pileated woodpeckers create cavities that are used by species incapable of excavating their own nesting or roosting cavities.

During field surveys, the greatest amount of pileated woodpecker use was consistently associated with stands of old-growth grand fir in the planning area. Stands with a major component of large ponderosa pine were also frequently used. Decayed logs and large snags support colonies of carpenter ants that comprise a high percentage of the diet of pileated woodpeckers (Bull 1987).

Figure 3-12. Elk Management Unit 11 and Issue Reporting Areas Around the Planning Area



Wildlife surveys indicate that portions of at least three pileated woodpecker territories occur in the planning area. The abundance of snags and down logs throughout most of the area has created good habitat for pileated woodpeckers. Most pileated observations were near old-growth stands in the east-central portion of the planning area.

Williamson's Sapsucker

The Williamson's sapsucker represents cavity-dependent species associated with mature forests that require snags for nesting, roosting, and foraging (Forest Plan, page II-27). Dense, mature forests are necessary for high densities, and deciduous trees in the understory are beneficial (USDA 1991).

Williamson's sapsuckers were observed along the eastern edge of the planning area in Section 31, and along the western edge of the area on the east side of Hazard Creek, indicating portions of at lest two territories in the planning area. The old-growth grand fir and Douglas-fir stands at the higher elevations provide ideal habitat for this species.

Vesper Sparrow

The vesper sparrow represents wildlife species associated primarily with dry, non-forest sites. There is circumstantial but unconfirmed evidence of breeding in the area surrounding and associated with the planning area (Stephens and Sturts, Idaho Bird Distribution 1991).

No vesper sparrows were observed in this planning area, but the recent clearcuts to the north and brushy hillsides above Hazard and Hard Creeks provide suitable habitat.

THREATENED AND ENDANGERED SPECIES

No federally listed threatened or endangered species were found within the planning area or within the surrounding cumulative effects area, as determined through wildlife field surveys and consultation with the U.S. Fish and Wildlife Service. In 1992, the Forest received updated location information for all threatened and endangered species on the Forest from the Idaho Department of Fish and Game's CDC (Conservation Data Center). A biological assessment is being prepared and will be available with the Final EIS.

Peregrine Falcon

There are two cliff faces within the planning area that could provide suitable nesting habitat for peregrine falcons, and there are other suitable sites surrounding the area. One site is near Hazard Falls on the north side of Hazard Creek. The other site is a ridge along the east side of Hard Creek near Morgan Lake. Other potential sites are along Hard Creek east of the planning area. Any falcons nesting on cliffs within 15 miles of the planning area could hunt songbirds and grouse in the planning area during spring, summer, or fall. The nearest known eyrie is 11 miles northwest of the planning area, but pioneering young from this site could begin nesting within the planning area in the future.

Gray Wolf

The planning area is not within the central Idaho gray wolf recovery area (USDI, Fish and Wildlife Service 1987). No wolf or wolf sign was observed during general wildlife surveys or wolf-howling surveys conducted in the planning area. Wolf sightings have been reported 7 miles west, 8 miles northeast, and 1 mile north , and wolves could potentially occur in the area in the future. The area is not ideal wolf habitat because of the steep topography over much of

the area. Voice-howling surveys were conducted for wolves, and additional surveys are planned for early spring of 1993. Pre-implementation surveys will also be required before any project-related activities take place. If wolves are detected during any of these surveys, the U.S. Fish and Wildlife Service will be informally consulted (see Mitigation Measure section, Chapter 2).

SENSITIVE SPECIES

Information from the Idaho Department of Fish and Game, the CDC, Stephens and Sturts (1991), wildlife field surveys, and Spahr et al. (1991) was used as the basis for determining if any Forest Service, Intermountain Region sensitive species or their habitats are present or potentially present within the cumulative affects area and the planning area. A biological evaluation for these species will be available with Final EIS for this sale.

The planning area was surveyed for wildlife species and habitat from August 27, 1992 to September 16, 1992. A total of 109 surveyor hours was expended searching for any threatened, endangered, or sensitive species believed to be potentially present. Tape-recorded vocalization surveys were conducted for goshawks, and additional surveys are planned for early spring of 1993.

Goshawks were observed in the planning area at three locations during surveys for this species. No nest sites were found, but goshawks may nest in the area and probably hunt over much of the area.

Other sensitive species that were not observed during surveys but have potentially suitable habitat in the planning area include northern three-toed woodpecker, white-headed woodpecker, flammulated owl, great gray owl, boreal owl, mountain quail, spotted frog, fisher, lynx, and wolverine.

Suitable habitat for the northern three-toed woodpecker includes forests with large concentrations of recently dead and decaying trees infected with bark beetles. These woodpeckers quickly move into recent burns and areas of insect outbreaks. They prefer feeding on lodgepole pine and spruce because of the scaly bark, which they flake off to find insects (Bull et al. 1986). Small areas of suitable habitat likely occur in the planning area along riparian zones and in the few old-growth spruce patches where spruce beetle may be present.

White-headed woodpeckers prefer open, seral stands of ponderosa pine old growth. A study on the Payette Forest found this species foraging and nesting in old-growth pine stands and partial cut harvest units that had residual large pines and soft snags (Frederick and Moore 1991). The old-growth ponderosa pine in the planning area is high-quality potential habitat. Other areas of mature forest with large ponderosa pine may also provide habitat in the planning area.

Flammulated owls generally inhabit forests with large ponderosa pine, Douglas-fir, and grand fir on ridges and on upper slopes with south and east aspects (Bull et al. 1990). On the Payette Forest, Moore and Frederick (1991) found these owls in stands of large ponderosa pine with open understories and about a 60 percent canopy closure. This is basically the same habitat described for the white-headed woodpecker above, with the addition of old-growth grand fir stands.

Great gray owls generally occupy very open old-growth stands of larch and ponderosa pine, with some Douglas-fir and lodgepole pine on north-facing slopes (Bull et al. 1988). A study on the Payette Forest (Atkinson 1989) found these owls in Douglas-fir/grand fir stands. Habitat descriptions in the CDC database and published literature (Bryan and Forsman 1987) indicate that open meadows and clearcuts are a necessary habitat component. A lack of open meadows in the planning area probably limits habitat for this species. Suitable habitat occurs along the north-facing slopes above Hard and Hazard Creeks.

Boreal owls inhabit high-elevation (above 6,000 feet) spruce-fir forests on the Payette National Forest (Hayward 1988). Subalpine fir habitat types comprise the primary habitat for boreal owls. The old-growth spruce and the areas above 6,000 feet along the very eastern edge of the planning area are potential habitat for these owls.

The only known mountain quail population in the vicinity occurs about 10 miles northwest of the planning area. These quail are found in dense brush and around mountain meadows (Spahr 1991). They move seasonally to different habitats and can migrate up to 20 miles. Important habitat features include woody cover near water. Suitable habitat appears to occur along Hazard and Hard creeks, especially near the large brush field located above Hard Creek.

Suitable spotted frog habitat in the planning area occurs along any of the riparian areas where stream gradient is not steep.

Suitable fisher, lynx, and wolverine habitat occurs over most of the planning area. However, lynx habitat usually includes areas of dense lodgepole pine used for hunting, and these stands are missing in the area. Wolverine would be most likely to use only the Hazard and Hard Creek riparian zones during winter and the higher elevations in summer. Fisher would likely find high-quality habitat in old-growth grand fir cover types.

ENVIRONMENTAL EFFECTS

The potential threats to wildlife habitats are primarily the loss of a habitat through conversion to other types of habitat, or degradation of existing habitat.

DIRECT AND INDIRECT EFFECTS

BIOLOGICAL DIVERSITY

Under all action alternatives, timber harvest activities could alter diversity in the planning area by modifying habitats. Timber stand modifications, such as overstory removal and the loss of snags and down logs, can remove habitat components needed by some species for survival. Loss of these components could reduce biological diversity in the planning area.

Alternative A would maintain biological diversity, barring a major fire, at a level similar to the present. All wildlife species dependent on old growth, other successional stages, specific habitat types, and stand structural components would likely maintain their existing populations under this alternative.

Alternative B would have the greatest impact on habitat conditions and would alter the populations of wildlife species more than any other alternative. This level of harvest may slightly reduce the biological diversity of the planning area but would not affect biological diversity over the subwatersheds.

Alternative C would provide the least risk to biological diversity of all action alternatives because of the small acreage affected. No changes of biological diversity within the planning area are likely.

Alternative D would provide an intermediate level of risk to biological diversity within the planning area and would not affect biodiversity over the subwatersheds.

Detailed analyses of the species and habitats considered most at risk are provided in the following sections.

SPECIAL WILDLIFE HABITATS

Special habitats may be lost during timber harvest activities under all action alternatives. For example, old-growth canopies could be harvested, changing light and temperature conditions in the residual understories. Open grassy ridges could have landings constructed on them. Riparian zones, small seeps and marshes could be disturbed by heavy equipment.

Alternative A would not greatly affect any special wildlife habitat. The south-facing brush field above Hard Creek could be gradually encroached by conifers over the planning period, but this would likely represent only a slight reduction of habitat acreage. Old-growth spruce could die as the forest-wide spruce beetle attack continues. Old-growth ponderosa pine habitat may gradually deteriorate in the absence of ground fires as young conifers compete for moisture with large pine trees.

Alternative B would reduce the old-growth spruce and ponderosa pine habitat more than any other alternative, but would maintain old growth spruce and old growth ponderosa pine stands above Hard Creek. Some ponderosa pine old growth near Hazard Creek would be harvested, but a 300-foot no-cut buffer along the stream would preserve a good portion of this habitat. Also, sufficient reserve snags and live wildlife trees would be retained within harvest units to allow old-growth dependent wildlife to continue at a reduced level of habitat use. Although this alternative has harvest units adjacent to more miles of riparian zone than any other alternative, riparian zones would be little impacted because of buffer strips, and habitat for some species, such as ruffed grouse and some species of songbirds, would be improved by harvest units as shrub cover increased.

The talus slope on the south side of Hazard Creek would have a harvest unit on the west side, but there would probably be no effect on wildlife habitat. The proposed sanitation salvage adjacent to the brush field above Hard Creek could slightly improve the habitat by reducing conifer shading.

Alternative C would reduce old-growth ponderosa pine along Hazard Creek, but not affect old-growth spruce habitat. Talus slopes and riparian zones, would not be impacted, and neither would the brush field above Hard Creek.

Alternative D would harvest in old-growth ponderosa pine and spruce but uneven-aged units would not affect wildlife use of these habitats. Talus slopes and riparian zones would not be affected. The brush field habitat above Hard Creek would benefit from the sanitation salvage harvest in the area.

MANAGEMENT INDICATOR SPECIES

Rocky Mountain Elk

EHE values would not be changed by any alternative in IRAs 369 and 362 (see planning records) because only a small area of those IRAs are within the planning area.

Elk habitat would be modified by all action alternatives. Habitat would be improved by creating additional forage in areas of extensive cover in the planning area. Also, all action alternatives would alter the juxtaposition of cover and forage, which can either improve or decrease elk habitat quality.

Alternative A would not effect EHE values in the planning area by any measurable extent.

Alternative B would decrease EHE for IRA 358 because the large proposed shelterwood units would cause the juxtaposition of cover and forage to decrease from good to fair. After tree cover improves in 10 to 20 years, the EHE would return to the existing condition (97) under this alternative.

Alternative B would create the most forage and decrease cover the most of any alternative, while forage would increase from 46 percent to 53 percent of the IRA, still within the ideal range. All other alternatives would have only slight effects on the cover-forage ratio.

Small openings would likely be created under shelterwood 3 prescriptions, but opening size would not exceed 40 acres (see Silvicultural and Logging Systems in the Timber section of this chapter).

Alternative C and D would likely have little effects at all on elk habitat except that the clearcut harvest unit in Alternative C would provide high-quality forage.

Table 3-12. EHE Values for IRA 358 in the Planning Area by Alternative.

	Forest Plan Goal		Existing		Planning Yr.2		Planning Yr.5		Planning Yr.10	
Alt.	EHE	Rd. Den.	EHE	Rd. Den.	EHE	Rd. Den.	EHE	Rd. Den	EHE	Rd. Den
A	90	2.3	97	0.3	97	0.3	97	0.3	97	0.3
B	90	2.3	97	0.3	89	0.3	89	0.3	97	0.3
C	90	2.3	97	0.3	97	0.3	97	0.3	97	0.3
D	90	2.3	97	0.3	97	0.3	97	0.3	97	0.3

Pileated Woodpecker

Pileated woodpecker habitat would be modified by all action alternatives. All alternatives would reduce pileated habitat quality by removing some snags, down logs, and large trees. Maintaining old growth under all alternatives would maintain populations of pileated woodpeckers at some reduced levels.

Alternatives A and D would not be likely to affect pileated territories or populations.

Alternative B would affect pileated woodpecker habitat the most by removing some snags, down logs, and large trees in old-growth habitat northwest of Morgan Lake and along the base of Bascom Canyon. The second greatest impact would be under **Alternative C** which would harvest grand fir old growth through a clearcut in the northeast corner of the planning area.

Alternative B and C could eliminate a pileated woodpecker territory from the planning area, but at least one territory would remain in both alternatives. Because of naturally low population densities, this reduction would be substantial; however, it would not affect species viability within or outside of the planning area.

Williamson's Sapsucker

The birch stands in the planning area may be important to this species, but, with mitigation described in Chapter 2, these stands would not be affected by any alternative.

Alternative A would not affect any sapsucker territories in the planning area.

Alternative B could affect two sapsucker territories near the west side and the east side of Section 7, but this impact would likely be minor because considerable habitat would remain undisturbed outside of proposed harvest units. **Alternative C** would not affect either territory. **Alternative D** could affect one of these territories, but, again, affects would likely be minor.

Vesper Sparrow

Vesper sparrow habitat would be increased under all action alternatives by creating additional openings throughout the forest. Because vesper sparrows may not be present in the nearby subwatersheds, the additional habitat does not guarantee that vesper sparrows will utilize it. The clearcut prescribed in Alternative C would create the most vesper sparrow habitat.

THREATENED AND ENDANGERED SPECIES

All action alternatives would incorporate timber sale contract provisions that would protect habitats or populations of any threatened or endangered species discovered after the sale is awarded. Protection would include stopping work until a qualified biologist can evaluate the project effects and recommend appropriate mitigation, if needed.

Peregrine Falcon

Peregrine falcons may potentially forage in the planning area. None of the alternatives would modify foraging habitat for this species in a way that would substantially reduce habitat quality or result in an adverse impact on this species. Timber harvest activities would alter the small bird prey base by reducing populations of cavity-nesting and interior forest species, but the prey base of edge and early succession species would increase. Any prescribed clearcuts

would retain adequate snags and reserve trees to serve as hunting perches.

Helicopter disturbance in all action alternatives could potentially affect peregrine nesting during spring harvest activities. Any helicopter harvest between March and June would be preceded by a survey of potential cliff nest sites (see Mitigation Measures section, Chapter 2).

Alternative A - Alternative A would not affect peregrine falcon foraging or potential nesting habitat. Prey populations would not likely change as a result of this alternative.

Alternative B - The successional stage changes that would occur under this alternative could have a major affect on potential peregrine prey populations in the area by decreasing populations of interior forest and snag-using species of prey, and by increasing populations of edge and open shrub-using prey. The effects of these prey population changes on potential peregrine foraging are unknown.

Alternative C - Harvest units would have similar impacts on the prey populations described for Alternative B, but these effects would be limited to the north end of the planning area.

Alternative D - Harvest units would likely have minor effects on successional stages and prey species, but a minor decrease in snag-nesting species could occur.

Gray Wolf

The effects on wolf habitat from all action alternatives would be to decrease wolf habitat quality somewhat through improved access, while improving wolf habitat quality by increasing big-game populations, especially deer.

The major adverse effect that could occur to wolves from any action alternative would be the disturbance to denning and young-rearing caused by harvest activities. This probability is extremely slight given the status of wolves on the Forest.

Alternative A would not change wolf habitat during the planning period. Access to the planning area and big-game populations would likely not increase or decrease.

Alternative B would have some positive and negative effects on potential wolf habitat. Elk habitat effectiveness would decrease under this alternative as a result of cover-forage juxtaposition. Although elk populations may slightly decrease as a result, deer populations may increase slightly. In terms of wolf habitat, the removal of cover could make wolves more vulnerable to illegal shooting, but openings in the forest could improve wolf foraging opportunities and may make the area more attractive for denning.

Alternatives C and D would be unlikely to have any substantial effects on wolf habitat, although Alternative D could slightly increase deer populations.

SENSITIVE SPECIES

All action alternatives would reduce habitat for various sensitive species, but no alternative would likely result in the loss of population viability of any threatened, endangered, proposed, or sensitive wildlife species. Confirmation of effects on species viability will be determined in the biological evaluation that will be prepared with the Final EIS for this sale.

All action alternatives would reduce snags and to some degree decrease habitat for snag-dependent species including, white-headed woodpecker, flammulated owl, boreal owl, and three-toed woodpecker, depending on habitat types affected. Because no road construction is proposed under any action alternative, habitat quality for fisher, lynx and wolverine--all of which are sensitive to human activities--would not be affected by increased human disturbance.

Goshawk

Although specific nest sites have not been found, goshawk use in the area has been confirmed, so the entire planning area, and subwatersheds containing the area, will be analyzed as a goshawk territory. Goshawk surveys indicate that either one or two territories may include the planning area. Currently, about 63 percent of the forest lands in the planning area are in the mature/old-growth successional stage. The Goshawk Management Recommendations for the Southwest (USDA 1992) recommend that 60 percent of a goshawk territory be maintained in the mature/old-growth stage, with the remaining acreage in young forest stages that can eventually replace any lost acreage in the mature/old-growth stages.

Alternative A could slightly decrease the quality of existing goshawk habitat through a gradual closing of the understory in relatively open ponderosa pine stands, which could somewhat inhibit goshawk foraging activities.

Alternative B would have both positive and negative effects on goshawk habitat, but overall effects would be negative. Positive effects would occur in the uneven-aged harvest units, as the small openings that are created would improve habitat for prey species such as grouse. Shelterwood units would improve habitat for some prey species by creating additional shrub and edge habitat.

Negative effects would result from the reduction in canopy cover and structural habitat in shelterwood units. Shelterwood units would reduce the acreage of the mature/old-growth successional stage to 43 percent, well below the recommended 60 percent (USDA 1992). Shelterwood harvests may provide suitable habitat for red-tailed hawks, great horned owls, great gray owls, and other predatory species that could displace goshawks or prey on their young (Crocker-Bedford 1990).

Adequate amounts of old growth would remain in the planning area to provide suitable nesting habitat for goshawks. It has been shown that goshawks prefer to nest in old-growth habitats that have a high percent canopy cover on lower portions of gentle slopes near water. They require about 90 to 180 acres for nest sites and replacement nest sites within their territory.

Even though sufficient nesting habitat would continue to exist under this alternative, foraging habitat would be reduced, and at least one existing goshawk territory could be eliminated. Possible effects on species viability will be determined in a biological evaluation for the preferred alternative in the Final EIS for this sale.

Alternative C would maintain 57 percent of the planning area in goshawk habitat and maintain adequate old-growth nesting habitat. It would deviate from the Southwestern U.S. Management Recommendations by creating a clearcut that is larger than recommended, removing goshawk habitat, and possibly attracting goshawk predators. It is unlikely, however, that this alternative would eliminate any existing goshawk territories.

Alternative D would most closely follow Southwestern U.S. management recommendations and would be unlikely to affect existing goshawk use of the area. These recommendations include:

- Forest structure is maintained,
- Forests contain large trees with open understories,
- Opening are limited to 1/3 to 4 acres in size,
- Patches of dense mid-aged forest are scattered throughout, and
- The majority of the forests are in mid-aged, mature, and old growth (USDA 1992).

Northern Three-toed Woodpecker

Alternative A would not affect potential three-toed woodpecker habitat in the planning area. Sufficient habitat may not be available currently to support a nesting territory.

Alternative B would reduce the overall foraging habitat in the planning area for three-toed woodpecker. Although lodgepole is not abundant in the planning area, spruce is a common tree over much of the higher elevations and at lower elevations along riparian zones. This spruce will continue to die from beetle attacks. This alternative would reduce spruce at higher elevations in many shelterwood units as it would be out-competed by faster growing firs and pines. Spruce would be retained within riparian zones.

Alternatives C and D would harvest very little spruce and would retain spruce within harvest units where it presently exists. These alternatives would have no effect on habitat or populations for this species.

White-Headed Woodpecker and Flammulated Owl

These two species require old-growth ponderosa pine habitat within their territories, along with an abundance of large snags. Thus, impacts to habitat would be similar for both species.

Alternative A would retain this habitat over the short term. Over the long term, old-growth ponderosa pine would gradually decrease. Assuming a 40-acre territory size for both of these species, about five quality potential territories could occur in the planning area for each.

Alternative B would decrease potential habitat by harvesting large ponderosa pine and opening harvest units to less than 30 percent canopy cover of trees larger than 17 inches in diameter. Wildlife trees and snags retained within harvest units would allow continued use of this habitat by these species, but probably at reduced levels. One large block of this habitat near the center of the planning area would be only slightly affected by a sanitation salvage unit. Overall, about 26 percent of the quality habitat would remain unharvested. This would retain two territories each for the white-headed woodpecker and flammulated owl.

Alternative C would decrease old-growth ponderosa pine habitat in the northern part of the planning area and retain two large blocks of this habitat in the center of the planning area. About 80 percent of the existing quality habitat would remain, enough to provide four territories for each of these species.

Alternative D would decrease the extent of old-growth ponderosa pine habitat in the northern part of the planning area, and would slightly affect the two large blocks in the center of the

planning area with a sanitation salvage unit. About 65 percent of the existing quality habitat would remain, enough to provide three territories for each of these species.

Great Gray Owl

Alternative A would not affect great gray owl habitat, which includes a combination of open and dense old growth with abundant large snags. The closing in of the open pine stands under this alternative may at some future date decrease great gray foraging habitat quality.

Alternative B would improve the quality of some habitat by providing open stands for hunting, but the large size of shelterwood units would likely limit these owls to the edges near unharvested old growth. Overall, this alternative would remove more great gray owl habitat than any other alternative. However, because the owls forage over a large area, the number of territories may not decrease. Potential nest sites would be reduced, though, especially if goshawks decline, as great grey owls often use goshawk nests.

Alternative C would have only minor effects on potential great gray owl foraging habitat, but the proposed clearcut could remove some nesting habitat.

Alternative D would have minor effects on potential great gray owl foraging habitat, and could be beneficial overall by increasing prey populations in small openings.

Boreal Owl

Impacts to boreal owls would be related to harvest activities in high-elevation spruce and mixed spruce and fir stands of old growth.

Alternative A would not greatly impact boreal owl habitat. Continued mortality of large spruce would occur, but would not affect habitat other than accumulating fuel for a large fire and allowing more sunlight into the stand, which would increase understory vegetation and make hunting more difficult. Because most potential habitat in this area is not pure spruce, but mixed conifers, this impact would be minimal.

Alternative B would impact the most spruce-fir old growth within the planning area and may have the greatest impact on potential habitat. Foraging habitat is the most difficult to maintain during timber management (Hayward and Hayward 1993). The large shelterwood proposed in the center of the planning area would have the greatest impact, although group irregular shelterwoods can be compatible with maintaining boreal owl habitat (Hayward and Hayward 1993). Adequate stand structure (mainly large down logs) would be maintained to provide for prey species, but understory vegetation development and sapling thickets would inhibit hunting and prey availability after a few years of growth. Also, no suitable nest stands would occur within that unit and no cool dense old-growth patches would remain for roosting habitat.

Alternatives C and D would have little impact on potential habitat, and the uneven-aged group selection units in Alternative D conform to recommended harvest methods by boreal owl biologists in boreal owl habitat (Hayward and Hayward 1993).

Mountain Quail

Alternative A would not affect mountain quail habitat. **Alternative B** would have little effect on potential mountain quail habitat. The shelterwood units could improve potential habitat

conditions by producing a variety of grasses, forbs and shrubs, improving forage for this species. **Alternatives C and D** would not likely have a noticeable affect on potential quail habitat.

Fisher, Lynx, and Wolverine

These three species have similar habitat requirements, and thus the impacts of alternatives would be similar. All three species prefer higher-elevation lodgepole or spruce fir stands with abundant riparian habitat. The riparian buffers under all alternatives greatly reduce impacts to these habitat. In general, all action alternatives would decrease habitat through fragmentation and loss of cover for these species, which seem to prefer relatively large blocks of interior forest habitat.

Alternative A would not have any known impact on habitat for these species.

Alternative B would have both positive and negative impacts. Dense thickets of young seedlings and saplings that would develop in shelterwood harvest units would improve habitat for snowshoe hares, an important prey species for all of these species, especially lynx. Also, small piles of slash would improve habitat for small mammals, another prey species.

In the short term, negative impacts on habitat would occur from a loss of hiding cover, which could make these species more vulnerable to shooting. Also, fisher would be unlikely to use the larger shelterwoods, except near the edges. Old-growth grand fir and spruce-fir are important to fishers and lynx, and Alternative B would have the greatest impact on those habitats. This alternative would likely have relatively minor effects on potential habitat for these species, except perhaps for fisher habitat in old-growth grand fir stands.

Alternatives C and D would have minor impacts on potential habitat for these species. By providing a variety of small openings, these two alternatives could improve prey populations.

Spotted Frog

Alternatives A and C would not affect potential spotted frog habitat along riparian zones.

Alternatives B and D would affect potential spotted frog habitat similarly to riparian zone and fisheries impacts discussed in those sections of this EIS. Alternative B would have the greatest potential to increase drying effects in riparian zones through increased sunlight, wind, and temperature, but prescribed buffers are likely wide enough to minimize that potential. Conversely, possible harvest units along Hard Creek Meadows under Alternatives B and D could improve grass hiding cover by reducing shade. Siltation of rock and boulder habitat where frogs can hide is also not expected to occur.

CUMULATIVE EFFECTS

BIOLOGICAL DIVERSITY

Over time, harvest operations throughout the cumulative area subwatersheds would reduce the distribution of wildlife species. A few species could no longer find sufficient habitat within one or more of the affected subwatersheds to sustain their populations, depending on future

management decisions. These effects will be analyzed in future environmental assessments or impact statements.

Alternative A would likely provide the greatest risk, as discussed in other sections, of high-intensity wildfire over the planning area subwatersheds. This event would have a major effect on biodiversity, especially on mature/old-growth dependent species, and affect use of the area for at least 80 to 100 years. In the absence of such an event, wildlife diversity would be maintained within these subwatersheds much like the present, regardless of what occurs on adjacent private lands.

Under Alternative A, the planning area could become more important to the maintenance of old-growth dependent species into the future, as scheduled timber harvest projects in surrounding subwatersheds become implemented. Over the next 7 years, these projects include 1) Fourmile, 2) Vance Creek, 3) Elk Creek, and 4) unknown projects on private lands. Environmental analyses required for these projects should evaluate the maintenance of biological diversity at the landscape scale.

Alternative B would likely maintain existing biological diversity in the planning area, but reduces populations of some species could decrease the refuge value of the planning area in maintaining core (source) populations. The biological diversity in adjacent subwatersheds would be more at risk as the above listed projects are implemented, and care will be needed during planning for those projects to ensure that diversity is maintained.

Alternatives C and D would maintain future biological diversity refuge values of the planning area subwatersheds in terms of maintaining old-growth populations in these and surrounding subwatersheds. Future re-entries into this planning area over time; however, could result in an old-growth condition similar to that under Alternative B.

SPECIAL WILDLIFE HABITATS

Over time, special habitats will generally be modified by timber harvest activities, but habitat may either increase or decrease. None of these habitats would likely disappear from a subwatershed entirely. These effects will depend on future management decisions which will be disclosed in environmental assessments or impact statements.

Alternative A could eventually reduce the brush field above Hard Creek as trees continue to pioneer, but this is a very slow process. Old-growth spruce habitat would eventually increase as the spruce beetle outbreak diminishes, and old-growth ponderosa pine would continue to decline as future fire suppression improves with more road building in surrounding subwatersheds. Future decisions could result in impacts similar to Alternatives B, C, or D below.

As noted previously, **Alternative B** would likely reduce old-growth pine and spruce habitat. Cumulatively, this could reduce this habitat to below the presettlement range across adjoining subwatersheds, but that would depend on future management decisions in those subwatersheds. This alternative could improve brush field habitat, which also may become less common within adjacent subwatersheds.

Alternatives C and D maintain more future management options for maintaining special habitats within surrounding subwatersheds. One option would include retaining old-growth

spruce, old-growth ponderosa pine, and brush field habitat in the planning area, while decreasing their extent in adjoining subwatersheds.

While Alternative D would maintain old-growth ponderosa pine and spruce after this initial entry, uneven-aged management assumes continued re-entries, which would eventually decrease these habitats.

MANAGEMENT INDICATOR SPECIES

Rocky Mountain Elk

Cumulatively, elk habitat, as measured by the EHE model, would improve for Elk Management Unit 11 under Alternatives C and D because the juxtaposition of forage would improve within the EMU. This improvement would be very slight and represent less than a one percent change. Under Alternative B the forage juxtaposition would remain fair. A slight decrease in the EHE value would occur, but it would be less than one percent. After ten years, elk habitat values would return to present levels for all action alternatives. Alternative A would not result in any change across the EMU.

Pileated Woodpecker

Pileated woodpecker habitat would decrease over time throughout all affected subwatersheds as snag populations gradually decrease in harvested units. Pileated populations would be maintained at lower levels in all subwatersheds, as would most old-growth species associated with pileated woodpecker habitat.

Under **Alternative A**, pileated woodpecker habitat would likely improve or remain at the same relatively high levels in the planning area subwatersheds. This would increase the importance of these subwatersheds to populations in adjacent subwatersheds as projects occur in those areas and populations decline.

Alternative B would likely result in pileated woodpecker populations in the planning area subwatersheds similar to or slightly higher than populations in surrounding subwatersheds. This level would be at minimum maintenance populations.

Alternatives C and D would also maintain high populations in the planning area subwatersheds and increase the importance of these subwatersheds in relation to populations in surrounding subwatersheds.

Williamson's Sapsucker

This species could slightly decrease or remain unchanged within the surrounding subwatersheds over time as other projects are implemented.

Vesper Sparrow

Vesper sparrow habitat would increase over time throughout the subwatersheds and may reach a threshold where enough habitat exists to sustain a vesper sparrow population in subwatersheds where none currently exists.

Under **Alternatives A, C, and D,** vesper sparrow habitat would increase slightly in the planning area subwatersheds. Under Alternative B, vesper sparrow habitat would increase in

the planning area subwatersheds and cumulatively contribute to increased habitat in surrounding subwatersheds.

THREATENED AND ENDANGERED WILDLIFE SPECIES

Peregrine Falcon

It is uncertain how these alternatives would cumulatively affect peregrine falcon populations. Alternatives A, C, and D would not likely affect the avian prey base for this species. Alternative B could change the avian prey base slightly to more closely resemble surrounding subwatersheds with many early successional species, but it is unknown if this would be a positive or negative impact.

Gray Wolf

The cumulative effects on potential gray wolf habitat over time would initially be positive as big-game habitat improves with additional forage availability. Potential wolf habitat could eventually decline as road densities increase to access most suitable timber areas in the planning area subwatersheds. Road closures are likely to partially mitigate these affects.

As more roads are constructed in surrounding subwatersheds, the importance of the planning area to wolves as a potential refuge from disturbance increases. Presently only Alternative B would affect that value by reducing cover in the short term. Over the long term, cover would return, mitigating this impact.

Sensitive Species

Cumulatively, sensitive species habitat is likely to decline for most sensitive species, but viable populations will likely be maintained in all subwatersheds where these species are currently resident.

As more areas are harvested in surrounding subwatersheds, the importance of old-growth habitat in this planning area will increase for several sensitive species, including white-headed woodpecker, three-toed woodpecker, flammulated owl, goshawk, great gray owl, boreal owl, fisher, and lynx. Alternative B would be most likely to decrease this value. Alternatives A, and C would have little effect on that value. Alternative D would also have little effect in the short term but could have a greater impact over the long term if identified harvest units are regularly re-entered for uneven-aged management.

As additional roads are constructed in surrounding subwatersheds, the importance of this area as a low-disturbance refuge could potentially increase for wolverine, lynx, and fisher. Alternative B could initially decrease that value by reducing hiding cover, but over the long term, no alternative would greatly reduce that value.

Most sensitive to cumulative effects is the goshawk because of its large territory size that can encompass several subwatersheds, and because it is known to occur in the planning area. Ideal foraging habitat for goshawks and for highest populations of goshawk prey species occur immature to old-growth forest with canopy cover of 40 to 60 percent (USDA 1992). Within the planning area and surrounding subwatersheds on private and Forest Service lands, shelterwood harvest prescriptions with canopy cover below 20 percent are occurring and appear to be the trend.

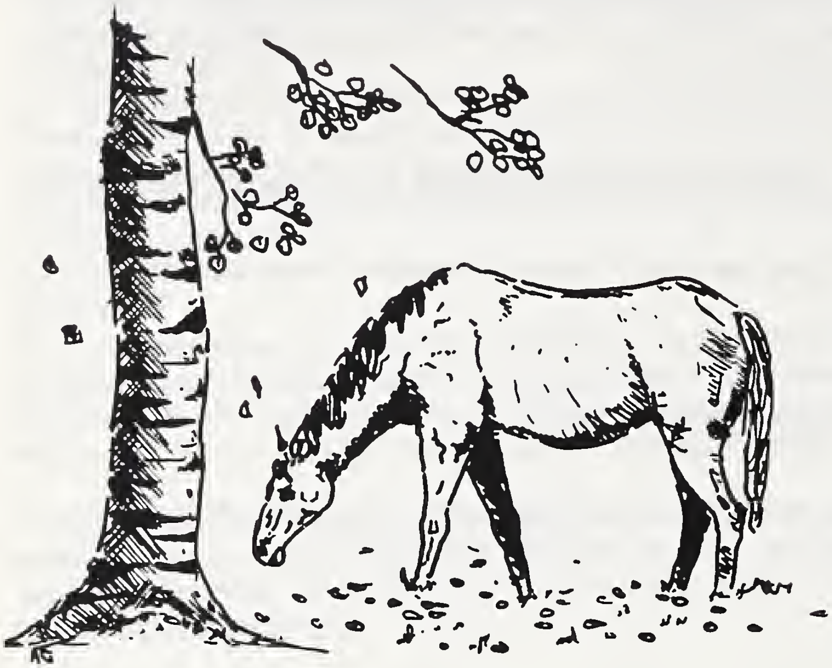
Between these shelterwood harvest units, adequate stands of old growth probably serve as nest stands and post-fledging stands (USDA 1992), but the large shelterwood units may be limiting goshawk foraging habitat and reducing prey species availability. Alternative B would add 734 acres of shelterwood to the cumulative effects of those surrounding shelterwoods. A more detailed analysis of these potential impacts on goshawks is being prepared in the biological assessment for the Final EIS for this sale.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

None of the proposed alternatives would create an irreversible or irretrievable commitment of wildlife habitat.

FOREST PLAN CONSISTENCY

All proposed alternatives are consistent with the Forest Plan for wildlife habitat.



Range

Effects on range was not raised as an issue for this sale. However, because the planning area included range resource for four different allotments, the Forest analyzed the effects of the proposed sale on permitted Animal Unit Months (AUMs), permittee operation, and range and riparian condition.

FOREST PLAN DIRECTION

Intensively manage suitable rangelands within existing allotments to maintain the existing permitted AUMs of 102,000 (Forest Plan, page IV-44).

DESIRED FUTURE CONDITION

Range resources will improve to good or excellent condition following intensive management practices. The 128 permitted AUMs in the planning area will be maintained (Forest Plan, page IV-44).

AFFECTED AREAS

The range resource in the sale planning area may be directly affected. The areas that may be indirectly or cumulatively affected are the range allotments that include the planning area.

AFFECTED ENVIRONMENT

Prior to 1958, early livestock grazing on the forest was "continuous." This meant that livestock had unrestricted use of high and low elevation ranges, no fences were used to direct patterns of use, and cattle and sheep often used the same areas concurrently. Plant vigor decreased, undesirable vegetation increased, and in many cases erosion caused significant loss in productivity. Consequently the forest implemented deferred and rest rotation systems to control livestock use. Range personnel reduced numbers, season of use, withdrew some areas from grazing, and established objectives for improving range condition.

Today the number of permitted livestock that graze in the forest is based on suitable range. Suitable range produces forage which can be grazed on a sustained yield basis, and is accessible or can be made accessible to livestock (FSH 2209.21). For a more detailed explanation of range suitability, see the Analysis of the Management Situation document and the planning records in the Supervisor's Office in McCall, Idaho.

A successful range program must manage first for healthy vegetative communities and productive soil conditions in order to sustain levels of permitted livestock use. Through an ongoing re-evaluation of standards and guidelines, these levels may be revised.

HAZARD HELICOPTER PLANNING AREA

The Hazard Helicopter timber sale planning area lies within portions of four grazing allotments. In all cases, the planning area affects only portions of the grazing allotments. The four

allotments include: Jacks Creek and Browns Creek cattle allotments and Grassy Mountain and Hard Creek sheep allotments. The following table shows the permitted use and season of use for these allotments, and how this relates to the Hazard Helicopter planning area.

Table 3-13. Permitted Use and Season of Use in the Planning Area Allotments

Allotment	Livestock Numbers	Grazing Season	AUMs	AUMs in Planning Area
Jacks Creek	420 cattle c/c	7/11-10/10	1,663	83 or 5% of allotment
Grassy Mtn.	950 sheep e/l	7/12-9/20	656	20 or 3% of allotment
Hard Creek	950 sheep e/l	7/12-9/20	656	20 or 3% of allotment
Browns Creek	142 cattle c/c	7/16-9/30	469	5 or 2% of allotment
		Total:	3,444	128 or 4% of allotments

c/c = cow/calf operation
e/l = ewe/lamb operation

The planning area for Hazard Helicopter extends from north to south across the Jacks Creek cattle allotment, Grassy Mountain and Hard Creek sheep allotments, and the Browns Creek cattle allotment. There is very little suitable range in the area for either sheep or cattle use. There is only incidental cattle drift into the Tepee Springs area on Jacks Creek allotment. Two years of sheep utilization monitoring on Grassy Mountain and Hard Creek allotments show that sheep trailing is the primary use within the planning area. The portion of the area within the Browns Creek allotment only receives incidental cattle use.

ENVIRONMENTAL EFFECTS

There are approximately 128 AUMs within the planning area out of a total of 3,444 AUMs for the four allotments that include the area. The primary use of sheep in the planning area is sheep trailing. Trailing is basically moving through the area on the way to and from other rangeland, which typically happens only two days a year. Incidental cattle use also occurs within the planning area. Very little impacts from the proposed timber sale on the range resource are anticipated.

DIRECT AND INDIRECT EFFECTS

Effects on Permitted Animal Unit Months (AUMs) No change in permitted AUMs would occur as a result of proposed activities.

Effects on Permittee Operation An adjustment in the permittees operation would not be necessary.

Timber harvest can affect current grazing systems by changing livestock patterns of use or by requiring a change in season of use. Because use is minor in the planning area, none of the alternatives would cause an adjustment to the permittee's operation. Forest personnel would

monitor livestock and sheep use after the harvest to ensure regeneration is protected.

Effects on Range and Riparian Condition The riparian areas currently utilized by cattle and sheep would continue to receive that use.

Because most of the proposed treatments are intermediate harvests, improvements or increases in forage available would be limited. Therefore, opportunities to redistribute livestock or sheep are limited and most likely would not occur. Livestock use would continue to be incidental cattle grazing and sheep trailing within the planning area.

The noxious weed, leafy spurge, occurs within the planning area. It is not expected to spread as a result of proposed activities. Eradication methods will continue to be used on this noxious weed, as well as on any others, if they are found in the planning area. These methods include spraying, grubbing, or other appropriate treatments.

CUMULATIVE EFFECTS

Because the effects from the proposed harvest would be very minor to the range resources, no major cumulative effects from this proposal, or other past, present, or foreseeable future proposals for harvest are anticipated on the range resource.

FOREST PLAN CONSISTENCY

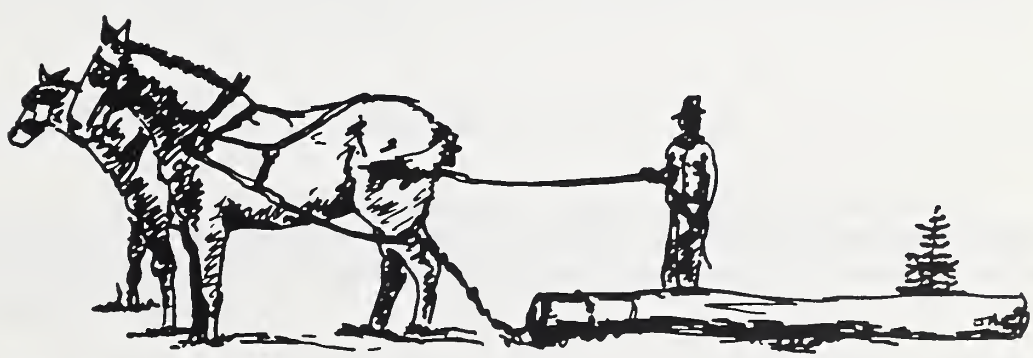
All alternatives would maintain permitted animal unit months. All alternatives would be within Forest Plan standards and guidelines for range management.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

There would be no irreversible or irretrievable commitments of range resources with the implementation of any of the alternatives proposed.

The Human Environment

Humans are an undeniable and important factor in the ecosystem equation, especially when we change the physical and biological environment to meet our needs. We depend upon the air to breathe, the water to drink, and the soil to provide us with food and raw building materials. But by interacting with the forest, we make it a human environment where plants and animals are grown and harvested to support us, where rivers are run and trails are hiked to entertain us, where artifacts are left behind for others to discover, and where roads are built to make our needs more accessible. There are still places where no roads go, however, and some of us revel in the wildness of these places, the tall trees, the pristine lakes, the whistling elk. Others look at the same features and see obstacles or opportunities to expand our influence. As caretakers of the land, the Forest Service is committed to blending and balancing human needs with the physical and biological elements of the ecosystem in a way that is responsible and sensitive to the environment.



Cultural Resources

Cultural resources were not identified as a major issue for this proposed timber sale. However, the National Historic Preservation Act and its regulations require inventory and consideration of potential effects on cultural resources.

FOREST PLAN DIRECTION

Protect significant cultural resources from damage or destruction by modifying project plans (page IV-3). Conduct a cultural resource assessment to determine whether a proposed project will affect significant cultural resources (page IV-4). Avoiding an effect is preferable to mitigating it. The assessment process complies with Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR 800).

DESIRED FUTURE CONDITION

Significant cultural properties are preserved. Development projects are not to affect sites on or eligible for the National Register of Historic Places.

AFFECTED AREAS

The area within which cultural resources may be directly or indirectly affected is the timber sale planning area. Cultural resources may be cumulatively affected within the French Creek/Patrick Butte Roadless Area.

AFFECTED ENVIRONMENT

Cultural resources are the remains of sites, structures, or objects used by past residents or travellers. They are non-renewable resources that tell of life-styles of historic and prehistoric peoples in this area. If damaged or improperly removed, they are irreversibly lost.

Forest Service archaeologists completed a cultural resource inventory of the Hazard Helicopter planning area in 1989. No cultural sites were found or are known in the area. The archaeologists prepared a narrative report including site maps, and sent it to the State Historic Preservation Officer for review and concurrence. The State Archaeologist for Idaho agreed with the determination on November 18, 1989.

ENVIRONMENTAL EFFECTS

Effects on cultural resources are a question of risk. Ground-disturbing activities such as timber harvest and tree planting can directly bury, damage, or obliterate a cultural site. Using helicopter or cable logging systems that reduce ground-disturbing activities can reduce but not eliminate these risks.

Increased public access can cause incidental damage and vandalism. Road closures can reduce this risk.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

ALTERNATIVE A - NO ACTION

There would be no effect to cultural sites—known or unknown.

ALTERNATIVES B, C, AND D

Known Sites Because none are present within the planning area, known sites would have no risk of disturbance.

Unknown Sites Forested areas have low probability for cultural sites, and the likelihood is low that any undiscovered sites in the planning area would prove to be eligible for the National Register. However, unknown cultural sites could inadvertently be damaged by logging activities. Most such damage would go undetected. If a site is discovered during logging, the Forest Service would stop work in the area until a Forest Service archaeologist could evaluate the site and its importance, and apply protective measures if warranted. (See Chapter 2, Mitigation Measures and Management Requirements.)

CUMULATIVE EFFECTS

Several future timber sales are proposed in the roadless area. The same inventory requirements and mitigation measures are expected to apply to those projects. Assuming the probability for cultural sites in the forested areas continues to be low, the cumulative probability of affecting sites eligible for the National Register would also be low.

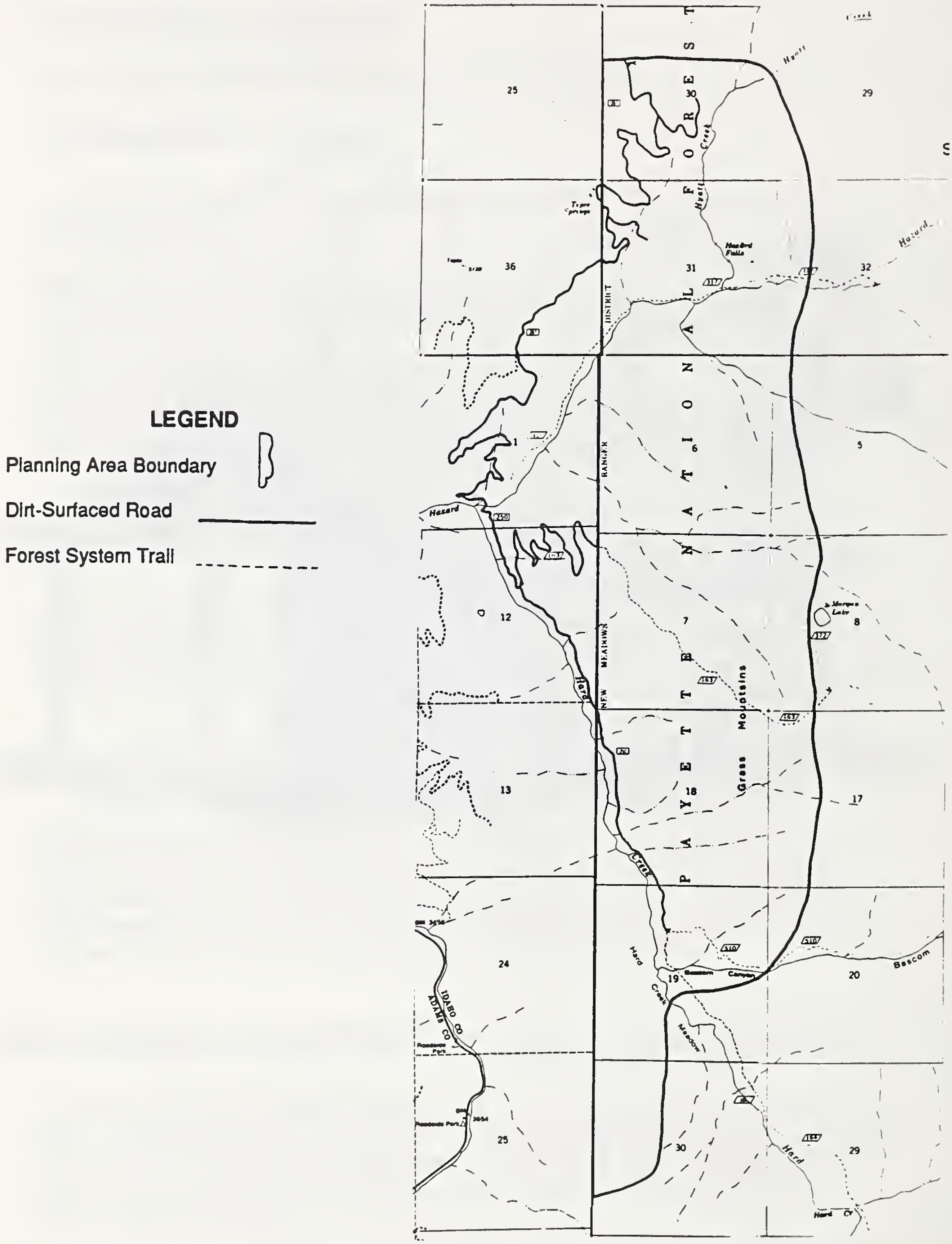
FOREST PLAN CONSISTENCY

All alternatives are consistent with the Forest Plan's management direction for cultural resources. Alternative A (No Action) meets the direction to preserve cultural properties and avoid effects on sites—both known and unknown—eligible for the National Register. The action alternatives, which follow the Forest Plan's inventory process and include the mitigations listed in Chapter 2, have a high probability of meeting the direction.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

Any damage to or loss of cultural properties would represent an irreversible and irretrievable effect. All cultural properties on the Forest are currently at a low risk for damage or loss from vandalism, theft, or ground-disturbing activities. The action alternatives would slightly increase the risk of damaging uninventoried cultural resources by implementing limited ground-disturbing activities.

Figure 3-13. Directly and Indirectly Affected Area for Recreation Resources



Recreation Resources

Issue: The issue is the effects that the proposed timber sale would have on the recreation opportunities in the planning area and in the overall roadless area. This issue includes effects on trails and on visual quality.

Indicators:
- **Length of trail corridor modified (miles)**
- **Acres visually affected**
- **Acres not meeting visual quality objectives**
- **Change in recreation opportunity spectrum (acres)**
- **Change in recreation visitor days**
- **Big-game hunting opportunities**

FOREST PLAN DIRECTION

Trails - Part of the Forest Plan is an Access Management Map that outlines general access management direction for the Forest. Each year the Forest prepares an annual Forest Travel Map that sets site-specific direction on permitted and restricted access for trails as well as roads and areas of the Forest.

Visual Quality - Evaluate and coordinate management activities to ensure they meet visual quality objectives (Forest Plan, pages IV-10 and IV-206). The Plan also gives guidelines on mitigation measures to use in timber harvesting and road building (page IV-22 to 23). Appendix B of the Plan gives more detailed guidance on how to meet VQOs in different timber types by varying rotation age, percent of area treated, opening size, and residual stand make-up.

Recreation - Create a diversity of user opportunities through the distribution of the ROS (Recreation Opportunity Spectrum) settings and through the trail system and other recreation facilities, while protecting resource values (page IV-9).

DESIRED FUTURE CONDITION

Trails - The Forest Plan has no explicit direction for trails. An interpreted desired future condition is that a trail system supports hiking, equestrian, and mountain bike uses, and also motorized use where compatible with the area's ROS category.

Visual Quality - Although the Forest Plan has no explicit desired future condition for visual quality, the desired condition for the planning area is interpreted as a primarily natural-appearing landscape, with the northwest portion including signs of management blended with the existing natural landscape.

Recreation - The Forest Plan's desired future condition for recreation includes an emphasis on dispersed recreation, a continuation of low-use densities, a moderate increase in use in proportion to local and state population growth, unavoidable conflicts at high-use points of interest, and some unavoidable resource damage and user conflicts from OHV (off-highway vehicle) use. An interpreted desired condition for the planning area is a predominantly natural-appearing setting offering hunting, hiking, and other non-motorized recreation, with the northwest corner offering a more roaded, developed setting.

AFFECTED AREAS

For the recreation resources, the area that may be directly affected is the planning area. The area that may be indirectly affected is the planning area and vicinity. The area that may be cumulatively affected is the French Creek/Patrick Butte Roadless Area.

AFFECTED ENVIRONMENT

Like the entire French Creek/Patrick Butte Roadless Area, the planning area offers diverse opportunities for dispersed recreation. Scenery is an important element in the recreational appeal of the area. Road building and timber harvest can modify the existing scenery as seen from trails, roads, lookouts, and other sensitive locations. Trails are especially important vantage points because proposed activities would occur in their foreground or middleground. Proposed development activities would also change the recreation setting and opportunities in the area, and therefore result in changes in the amount and types of recreation use.

The discussions below are in three sections--trails, visual quality, and recreation--that together comprise the recreation resource.

TRAILS

Forest trails give people access by foot, horseback, mountain bike, motor bike, all-terrain vehicle, or four-wheel drive vehicle. Many trails now maintained as part of the Forest system began as sheep herding routes, mining access routes, hunters' trails, or even game trails. The Forest maintains each trail to a degree that fits its intended use or uses.

Hazard Helicopter Planning Area

Part or all of four system trails are in the planning area (see Figure 3-13). Trail 317 crosses the area along Hazard Creek for one mile. It has a sensitivity level 2 and is lightly used. Trail 163 crosses the area from the Forest boundary to Morgan Lake for 1.7 mile and then heads east to the Goose Lake road. It has a sensitivity level of 1 and is lightly used. Trail 510 follows Bascom Creek for 0.7 mile up to Trail 163 east of the planning area. It is hard to find, gets very light use, and is being removed from the Forest trail system. Trail 164 starts at the end of Forest Road 250 and soon exits the planning area to the south through Hard Creek Meadow toward Forest Road 294.

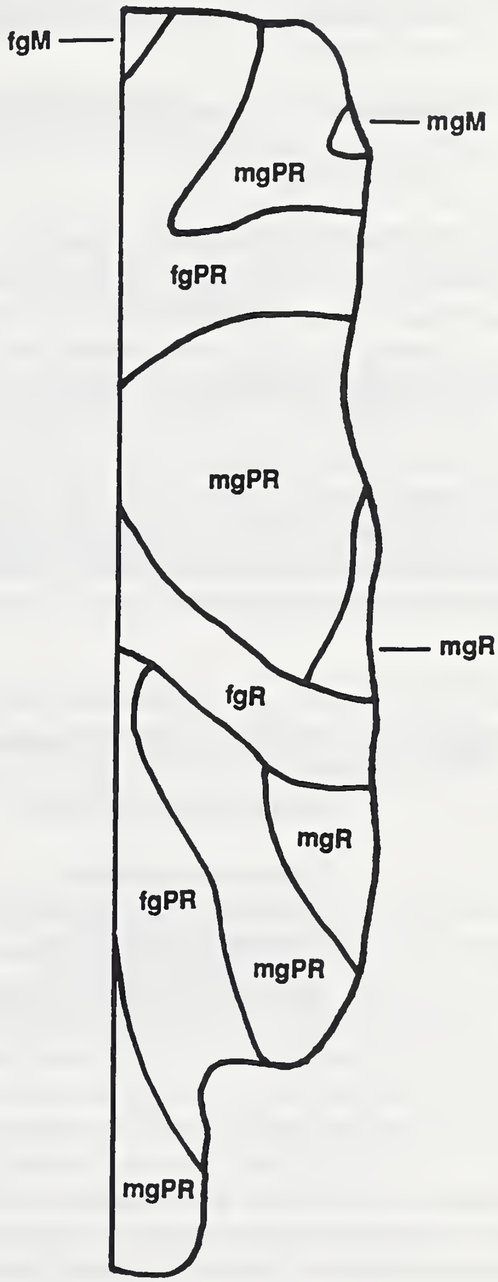
None of the trails has proper right-of-way over private land to allow legal public access to its trailhead, but opportunities exist to provide a quality recreation experience along each trail. Trails 317 and 163 are open to motor bikes, while Trail 510 is not. The northern half of Trail 164 is open to motor bikes and ATVs but the southern half is not.

VISUAL QUALITY

Scenery is an important resource in this part of the Forest. It is through their visual sense that most visitors primarily perceive the area. Part of the public appeal of the planning area stems from its unspoiled natural scenery.

Forest Plan direction would partly modify the existing appearance of the planning area. It assigns a visual quality objective to each area of the Forest, reflecting the desired management emphasis of the specific area. Some of the objectives allow a noticeable degree of change from the present appearance, though activities should borrow from the natural-appearing line, color, form, and texture of the landscape. (See Appendix E for a summary of the process of developing and applying visual quality objectives.)

Figure 3-14. Visual Quality Objectives (VQOs) for the Planning Area



Abbreviations for VQOs

fgR	Foreground Retention
fgPR	Foreground Partial Retention
fgM	Foreground Modification
mgR	Middleground Retention
mgPR	Middleground Partial Retention
mgM	Middleground Modification

The specific visual quality issue is the effects the sale would have on visual quality as seen from both within and outside the planning area. Management activities can cause changes in the scenery as seen from these locations.

Three VQOs (visual quality objectives) apply to this part of the roadless area:

1. **Retention**. Management activities are not visually evident to the casual observer.

2. **Partial Retention**. Management activities remain visually subordinate to the characteristic landscape.

3. **Modification**. Management activities may visually dominate the landscape, but must borrow from naturally established form, line, texture, and color so they appear similar to natural occurrences.

Hazard Helicopter Planning Area

The planning area is a moderately steep, west-facing slope lying between Hard Creek and Hazard Creek. It is unroaded and appears as an unmodified green forest canopy broken by natural openings and, in the north, harvest units. The forest is mainly two-storied stands of ponderosa pine and Douglas-fir, with grand fir increasing in the understory.

Half of the planning area has a VQO of Partial Retention as seen as middleground from a few places along Highway 95 to the west. The Hazard Creek Trail 317, and the Hard Creek Road and Trail 164 have a Partial Retention VQO as seen from the foreground. The Grass Mountains Trail 163 has a Retention objective (Figure 3-14). VQO acres for the planning area are displayed in the following table.

Table 3-14. Visual Quality Objective Acres In the Planning Area

Visual Quality Objective	Acres
Foreground Retention	437
Foreground Partial Retention	1,279
Foreground Modification	31
Middleground Retention	299
Middleground Partial Retention	2,095
TOTAL	4,141

Along the trail to Hazard Falls, the canyon topography is very steep and scenic, with rocky cliffs and brushy faces intermingled with stands of timber on the north-facing slope, and scattered timber on the south-facing slope. The trail to Grass Mountains climbs an open ridge and offers sweeping vistas to the north and west, including part of the planning area. The Hard Creek Road and Trail offer occasional creek views in a forested corridor. The Bascom Canyon route is forested and limited in its views.

RECREATION

The issue is important because recreation is now a main use of the planning area and the roadless area. The indicators are appropriate because they provide ways to measure different aspects of recreation—opportunity, general visitation, and hunting. Much of the current recreation in the planning area is hunting use; but hiking, horse riding, camping, backpacking, motorbike riding, mountain bike riding, and fishing also occur at relatively low densities. In the roaded portion, driving for pleasure, firewood cutting, snowmobiling, and gathering berries, mushrooms, and other forest products also take place.

Recreation in this EIS is measured in two quantitative variables: acres by ROS (recreation opportunity spectrum) class, and RVDs (recreation visitor days).

ROS Class - The planning area is primarily inventoried as offering "semi-primitive motorized" recreation opportunities. The northwest corner offers "roaded modified" opportunities. For management purposes, the Forest Plan assigns "roaded modified" and "semi-primitive" ROS classes similar to the inventory. ROS classes are further defined below.

> **Semi-Primitive Motorized** Natural-appearing landscapes are emphasized. Evidence of human use does not draw the attention of motorized users. Interaction among users is low to moderate. Roads are absent, but motorized vehicles such as motorbikes and ATVs may be present on trails.
>
> **Roaded Modified** Resources may be substantially modified, and modifications may not fully harmonize with nature. User interaction may be moderate to high. These areas provide altered settings where users can test their outdoor skills away from more used areas and where recreation is not the main objective. Roaded areas away from main Forest roads often fit this category.

Recreation Use - An RVD is defined as one person's recreation-related activity on the National Forest for a 12-hour period. The RVDs are measured for developed facilities such as campgrounds, and estimated for dispersed recreation areas such as roadless areas in which direct counting is not feasible.

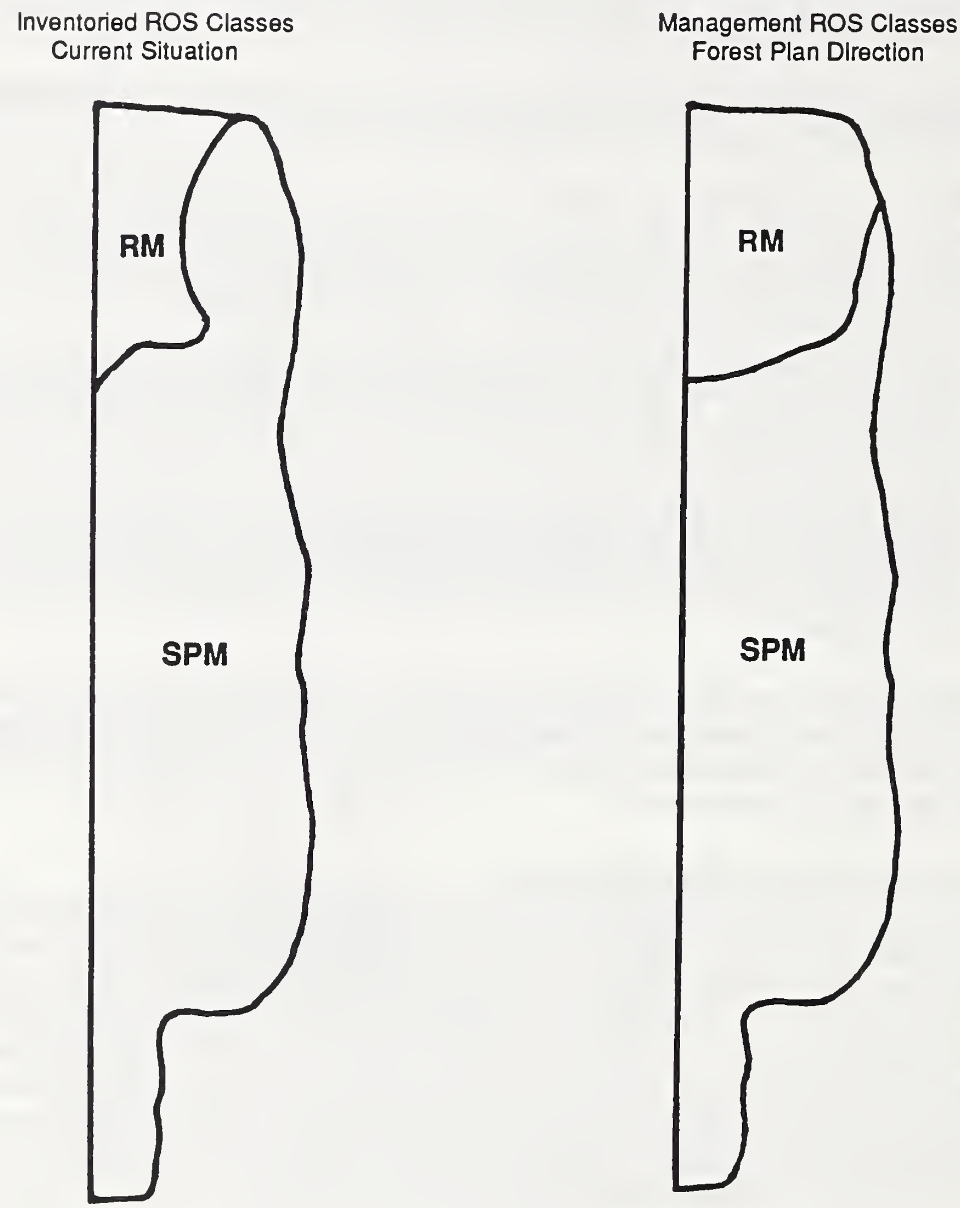
Hazard Helicopter Planning Area

The planning area contains the lower portions of two tributaries of the Little Salmon River—Hazard and Hard Creeks. They are the area's main recreation attractions, as accessed by two of the three trails. Recreationists reach the area from the west over private logging roads with no public right-of-way. Providing legal right-of-way would be an opportunity to increase recreation use of the area. From the west, hikers, motorbikers, mountain bikers, and equestrians can follow the trail up Hazard Creek to Hazard Falls, where the trail disappears soon after. Or they can hike up the ridge trail overlooking Morgan Lake and Coffee Cup Lake and over to Grass Mountain Lakes. Or they can hike up Bascom Canyon to Grass Mountain Lakes. Or they can follow the trail up Hard Creek to the Brown Creek Road.

The Bascom Canyon route has no visible trail, and both it and the trail from Morgan Lake to Grass Mountain Lakes have very rough, steep sections.

ROS Class - All of the 4,141-acre planning area is inventoried as semi-primitive motorized, except 550 acres in the northwest corner that are roaded modified. The Forest Plan keeps all but 950 roaded modified acres in the semi-primitive motorized ROS class. This allows non-

Figure 3-15. ROS Classes for the Planning Area



ROS (Recreation Opportunity Spectrum) Class

RM = Roaded Modified
SPM = Semi-Primitive Motorized

intensive timber harvesting but no road building (see Figure 3-15).

Recreation Use - Recreation use totals an estimated 1,230 RVDs per year, much of which is hunting. Other activities are hiking for pleasure, backpacking, camping, and trail and mountain bike riding.

ENVIRONMENTAL EFFECTS

Effects on recreation resources are a question of changes to the recreation setting, consisting mainly of the three variables discussed above—trails, visual quality, and recreation opportunities. The discussion of each alternative below follows these three categories. See Appendix E for methodology used for estimating future effects on the recreation resources.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

Trails

The present trail mileage of 3.1 miles would not change. The 0.7 mile Bascom Canyon trail has disappeared and is no longer in use. All alternatives would leave the trails open to hikers, horseback riders, mountain bikers, and motorbikers. To maintain secure elk habitat, the trails would continue to be closed to ATVs (except Trail 164) and highway vehicles year-round.

To protect the trail corridors and their visual quality, any trail segment damaged by logging would be re-established through the harvest units. No new trails would be built.

Visual Quality

In all action alternatives, helicopter harvesting would modify the natural landscape to varying degrees. The sights of logging—stumps, slash, flagging, tree-marking paint, and cleared helicopter landing pads—would be visible at close range. However, few people would leave the roads and trails and enter the units. The group selection openings (up to 2 acres in size) of the uneven-aged prescriptions would be very visible at close range and somewhat visible at medium range—especially those openings that follow straight-line boundaries. From a distance, however, it would be difficult to detect them or the overstory removal pattern of the shelterwood prescriptions.

Recreation

Roads - Each action alternative would reconstruct access roads. This analysis assumes that, before the sale, the Forest Service or Bureau of Land Management acquires a public right-of-way over roads to the sale—up Hazard Creek and up Hard Creek. It also assumes this would give legal access to these roads for public recreation access. Alternatives B and D would acquire right-of-way to all three trailheads (Hazard Creek, Grass Mountains, and Hard Creek). Alternative C would acquire right-of-way only over the Hazard Creek road. The recreation projections below depend on these assumptions. If right-of-ways are not acquired as assumed, then the projected recreation increases would not occur.

Visitation - Although the degree of effects would vary by alternative, the nature of effects would be similar for all the action alternatives. Recreation use patterns would change. Harvested areas would become less suitable for previous types of use and more suitable for

different types of use. The amount of use is more difficult to predict. Little empirical evidence is available to show whether harvest units would attract more recreationists or discourage them from visiting. Nevertheless, some specific assumptions and general projections are possible for this planning area:

> **Before the sale,** recreation would increase about three percent a year, consistent with the regional population growth. Upon acquisition of public right-of-way over the access roads, both motorized and non-motorized recreation would increase substantially.
>
> **During sale activities,** hiking and other non-motorized uses may decline due to logging traffic. Other visitors may be temporarily attracted to the area to observe the helicopter logging.
>
> **After the sale,** recreationists would have motorized public access over existing roads. One, two, or three trailheads would have legal public access and greater use. Some people who had previously visited the area for its undeveloped backcountry character would not return but would go elsewhere. The overall amount of recreational use would increase at different rates approaching the population growth rate, depending on the alternative.

Hunting - In all action alternatives, elk habitat quality would not change much. Deer and elk hunting opportunities would increase with legal public access. Big-game hunters would continue to visit the area in the fall hunting season. Some may stop coming because of the reduction of undeveloped character, but others would come into the area in their place. Small game hunters would follow a similar pattern.

Major Change - In any alternative, if an unexpected event such as major wildfire or major reduction in elk population occurs, then the setting would change and visitation by hunters and other recreationists would decrease in the near-term.

DIRECT EFFECTS BY ALTERNATIVE

In each alternative below, there are three sections: trails, visual quality, and recreation. In turn, the recreation section has two paragraphs. The **Opportunities** paragraph shows the alternatives' effects on the suitability of the land to provide types of recreation experience in terms of Recreation Opportunity Spectrum. The **Recreation Use** paragraph describes the changes in the predicted amount of use in terms of recreation visitor days.

ALTERNATIVE A

Trails

The alternative would have no effect on the current situation. The 3.1-mile trail system within the planning area would continue under management of the Forest Travel Map. The trails would remain open to motor bikes, although some segments would be unusable or unsafe in their current condition.

Visual Quality

The alternative would continue the present scenery, which would be subject to natural processes such as fire, wind, drought, and natural succession.

Recreation

Opportunities - The recreation opportunities in the planning area would continue unchanged by development. The existing 3,550 acres would remain suitable for semi-primitive recreation.

Recreation Use - Recreation use would increase with the new public right-of-way to the roads and trails, and with the regional population growth of three percent per year. Total visitation would increase a projected 65 percent by the year 2003. If right-of-way is not obtained, the increase would be a projected 30 percent, same as the regional population growth.

Elk habitat quality in the planning area would not change. Elk and deer hunting opportunities would increase with legal public access.

ALTERNATIVE B

Trails

Timber harvesting would not cross the trails except for one harvest unit on the Grass Mountains Trail (163) for 1/4 mile and beside it for another 1/2 mile. If the slash cleanup measures in Chapter 2 to protect the trail are implemented, the current trail would remain intact.

Visual Quality

Overstory removal would affect about 800 acres throughout the planning area. The stands would take on a more open and uniform appearance, but the change would not be readily apparent at medium to long range. The harvesting would easily meet the partial retention visual quality objective. Large stumps and slash would be visible along the retention corridor of Trail 163. If foreground clean-up mitigations are applied, the result would not be unsightly.

Recreation

Opportunities - This alternative would harvest timber on 12 units throughout the planning area with overstory removal of large trees. The semi-primitive area would be modified by the harvest. The stands would become more managed and uniform in appearance by the addition of stumps and slash and the removal of overstory, although the acreage would remain in the semi-primitive category.

Recreation Use - If the public gains legal access to all the planning area roads and trails, recreation use would increase a projected 65 percent by the year 2003. Without the access, the projected increase would be 30 percent.

ALTERNATIVE C

Trails

No road building or timber harvesting would occur on the trails. Therefore, the alternative would have little effect on the current trail situation.

Visual Quality

Only the northern end of the planning area would have any activity. Five overstory removal units would come down near the Hazard Creek Trail, and some stumps and slash would be visible in the partial retention visual corridor. If foreground clean-up mitigations are applied, the treated area would not be objectionable to most. The 33-acre clearcut in the northeast

corner of the sale would probably meet the partial retention visual quality objective, and would not be visible from the middleground to the west.

Recreation

Opportunities - The alternative would harvest timber on both sides of the Hazard Creek Trail. About 500 semi-primitive acres would be developed by signs of harvesting—stumps, slash, and removal of overstory. The 33-acre clearcut unit would be inconsistent with the existing inventoried semi-primitive category and would move about 100 surrounding acres into the roaded modified category assigned by the Forest Plan.

Recreation Use - If the public gains legal right-of-way to all the planning area roads and trails, recreation use would increase a projected 73 percent by the year 2003. Without the access, the projected increase would be 30 percent.

ALTERNATIVE D

Trails

Like Alternative B, no timber harvesting would occur on the trails except for one harvest unit on 1/4 mile of the Grass Mountains Trail and beside it for another 1/2 mile. If the slash cleanup measures in Chapter 2 to protect the trail are implemented, the trail would remain intact.

Visual Quality

Overstory removal would affect over 500 acres throughout the planning area. The small openings would give the slopes a pock-marked appearance, but the change would not be readily apparent at long range. The change would easily meet the partial retention visual quality objectives. Large stumps and slash would be visible along the retention corridor of the trail. If foreground clean-up mitigations are applied, the area would not be a distraction.

Recreation

Opportunities - This alternative would harvest timber on eight group selection units and two overstory removals throughout the planning area. The semi-primitive area would be modified by the small openings created. The stands would become more managed in setting, although the acreage would remain in the semi-primitive category.

Recreation Use - If the public gains legal right-of-way to all the planning area roads and trails, recreation use would increase a projected 57 percent by the year 2003. Without access, the increase would be about 30 percent, same as the projected regional population growth.

Table 3-15 on the following page shows the specific effects of the alternatives on the indicators of the recreation issue.

Table 3-15. Recreation Consequences by Alternative

CONSEQUENCES INCLUDING INDICATORS	Current Situation	ALTERNATIVE A	B	C	D
Trail Corridor Affected (miles) by Stumps and Slash	0	0	0.75	0	0.75
Acres Visually Affected	0	0	836	205	555
Acres Not Meeting VQOs	0	0	0	0	0
ROS Acres:					
Semi-Primitive (SPM) Acres					
Not Developed:	3550	3550	2714	3245	2995
Developed:	0	0	836	205	555
Roaded Modified (RM):					
Acres:	550	550	550	650	550
Recreation Visitor Days, Percent Change by Year 2000	1230 RVDs	+65%	+65%	+73%	+57%
Big-game Hunting Opportunities by Year 2000	---	Increase	Increase	Increase	Increase

CUMULATIVE EFFECTS

TRAILS

Hazard Helicopter is one of six proposed sales being analyzed in the French Creek/Patrick Butte Roadless Area. Trail miles for each sale are displayed in the table below.

Table 3-16. Trail Miles in the French Creek/Patrick Butte Roadless Area Proposed Timber Sales

Proposed Sale	Trail Miles in Planning Area
Fourmile	1.2
Freight Landing	0
French Creek	11.6
Hazard Helicopter	3.1
Jenkins	1.4
Lower Elkhorn	4.1
TOTAL	21.4

The Forest Plan Activity Schedule (Appendix A) also lists some outyear timber sales in the roadless area. The trail miles for these sales are displayed in Table 3-17.

Table 3-17. Trail Miles in the French Creek/Patrick Butte Roadless Area Outyear Sales

Outyear Sale	Trail Miles in Planning Area
Elkhorn Lodgepole (1998)	1
Lake Creek Helicopter (1998)	4
Partridge Helicopter (1998)	2
Beulah Butte (1999)	1
French Creek Lodgepole (2001)	2
TOTAL	10

Whether the trails would be rebuilt or relocated or abandoned is unknown. Road building and timber harvest would not directly affect all the trail miles in the sale planning areas. However, the outyear sale total would be a maximum of about 10 miles of trail affected. The entire roadless area has about 175 miles of maintained trail, 21.4 of them in the six proposed sale areas. Thus, the cumulative total of up to 31.4 miles of trails affected by the action alternatives would represent up to 18 percent of the roadless area's trail system.

VISUAL QUALITY

Past Actions

Around the edges of the roadless area, signs of intensive management in the past are visible. The proposed actions would expand the visual effects already caused by previous road building, clearcutting, shelterwood harvesting, and plantation management. Clearcuts and some shelterwood units are common landscape elements.

Future Actions

In addition to the six proposed and five outyear sales, other sales are reasonably foreseeable in the vicinity on Bureau of Land Management land, Boise-Cascade Corporation land, as well as National Forest land. It is too early to quantify or even describe their visual effects with any certainty. Nevertheless, if they resemble the near-term sales in their design, then their cumulative effect would be to further convert the natural-appearing roadless landscape toward a patchwork pattern of harvest units of varying sizes, shapes, and ages. After a few decades, the edges of the roadless area would take on a widespread managed mosaic appearance.

RECREATION

Future Actions

The six proposed sales would build about 37 miles of road and harvest over about 3,600 acres, changing most of these acres from semi-primitive to roaded modified condition. The proposed outyear sales would build about 18 miles of road and harvest another 9,000 roadless acres,

effectively converting those areas from semi-primitive to the roaded modified ROS class.

This acreage would cumulatively convert about 8 percent of the roadless area from semi-primitive to roaded modified. Areas converted would be mostly around the edges of the roadless area, adjacent to other roaded modified lands.

Cumulative development of the roadless area would displace some recreationists and require them to go elsewhere, putting slight added pressure on the remaining roadless resource.

In addition, other timber sales in roadless areas on the Payette Forest and possibly adjacent Forests would displace semi-primitive recreation users to the remaining undeveloped areas. On the one hand, this displacement would add to the cumulative sensation of becoming crowded that users experience as their traditional recreation spots are developed. On the other hand, the change would make more area available for recreation on closed roads, such as short-duration hunting trips, and give easier access by mountain bike or motorbike into newly-developed areas.

FOREST PLAN CONSISTENCY

TRAILS

All alternatives are consistent with Forest Plan management direction. Alternative A, however, would defer action for an indefinite period. All action alternatives would meet Management Area 10 direction to coordinate trail management with the overall trail system (page IV-250).

The Forest Plan has no specific policy on trail loss in timber sales. All alternatives would meet Forest Plan direction on trail restrictions and closures. The annual update process of the Forest Travel Map allows site-specific adjustments of open/closed status of some trails. Alternatives A and C would leave a larger trail network undisturbed than the other action alternatives.

VISUAL QUALITY

The Forest Plan desired future condition allows some visual deterioration in managed areas, as long as the alterations meet VQOs. All four alternatives meet all visual quality objectives set by the Forest Plan if harvesting in the action alternatives does not exceed the scale presented in Chapter 2 of this EIS.

RECREATION

No alternative conflicts with the Forest Plan. The Plan allows a limited amount of extensive helicopter timber harvest within the management area subject to recreation and visual protection. Therefore, the action alternatives that harvest timber better move toward this aspect of the desired future condition, while reducing semi-primitive values. Alternative A leaves the roadless area undeveloped and better attains the recreation and visual elements of the semi-primitive ROS setting of the desired future condition.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS

TRAILS

No alternative would have irreversible or irretrievable effects on trails.

VISUAL QUALITY

Alternative A would cause no irreversible or irretrievable effects to visual quality.

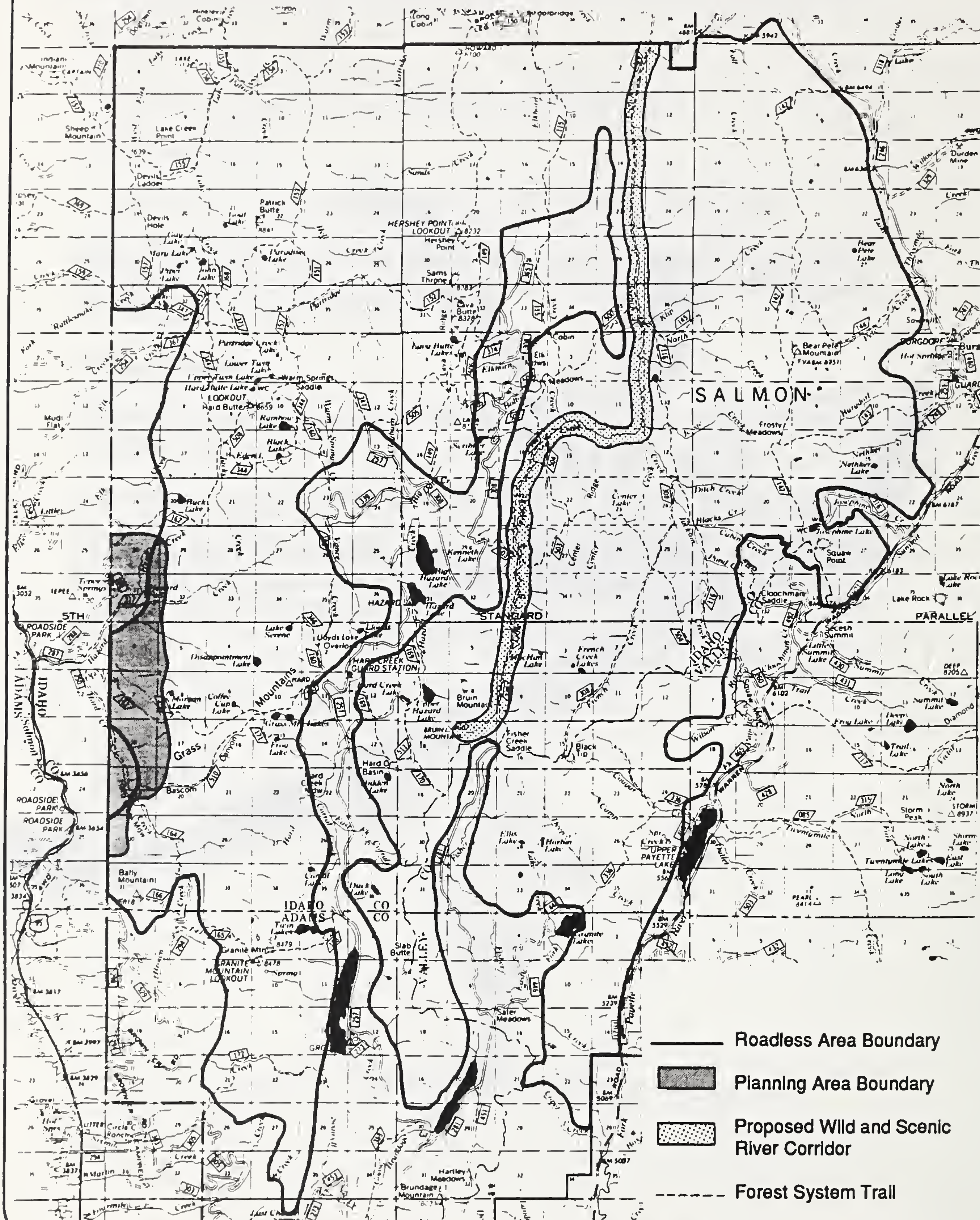
Because vegetation grows back over time, timber harvesting would not cause irreversible impacts. Until full regrowth, however, the reduction of visual quality after timber harvest in the units would be an irretrievable loss.

RECREATION

Alternative A would be an irretrievable loss of opportunity to recreate in a roaded modified setting here and at this time.

The action alternatives would have the irretrievable effect of changing semi-primitive landscapes to more modified ones. This change would also be irreversible within our lifetimes, which is the minimum time period needed for natural succession to restore the area to near its present condition. The opportunity to recreate in an undeveloped setting in portions of the planning area would be irretrievably lost for this period.

Figure 3-16. Affected Areas for Roadless Character and Wilderness Potential



Roadless Character and Wilderness Potential

Issue: The issue is the effects that the proposed sale would have on the roadless character and wilderness potential of the Hazard Helicopter planning area and the French Creek/Patrick Butte Roadless Area.

Indicators:
- **Acres in the roadless area eligible for future wilderness consideration**
- **Wilderness attributes:** **Natural appearance**
Natural integrity
Opportunities for solitude
Opportunities for primitive recreation
Special features

FOREST PLAN DIRECTION

The Forest Plan does not have a section entitled "roadless" and does not provide direction for the roadless resource. However, it does make land allocations and gives Management Area direction that crosses over roadless area boundaries. A roadless area is therefore an inventory classification, not a management category.

DESIRED FUTURE CONDITION

The Forest Plan did not state a desired future condition for roadless character. However, the Forest Plan allocated the planning area to semi-primitive condition, preserving its roadless character, except for the northwest portion in which development would result in loss of roadless character and wilderness potential.

AFFECTED AREAS

For the roadless/wilderness resource, the area that may be directly or indirectly affected is the planning area and its immediate vicinity. The area that may be cumulatively affected is the French Creek/Patrick Butte Roadless Area (see Figure 3-16).

AFFECTED ENVIRONMENT

BACKGROUND TO THE ROADLESS ISSUE

Two decisions indicate that development entries into roadless areas are significant impacts on the environment:

1. California v. Block (1982) required that the Forest Service fully analyze specific impacts of non-wilderness management before making an irreversible and irretrievable decision to commit a roadless area to such management.

2. The 1988 Chief's decision on appeals (#2130) of the Idaho Panhandle National Forest Plan determined that Forest Plans do not make the irreversible or irretrievable decision to commit roadless areas to non-wilderness. Site-specific environmental analysis is necessary to make such decisions. This means that an environmental impact statement is necessary for most development entries into roadless areas.

The issue involves the undeveloped condition of the planning area, its potential for future wilderness consideration, and the effects of road building and timber harvesting on the roadless character and therefore wilderness potential.

The issue is important to many people who want roadless areas kept roadless and unspoiled, or to be recommended for wilderness. It is equally important to others who want them developed, managed, and made accessible and usable to the general public.

The question is important to the Forest Service because the issue of National Forest roadless areas has been a national controversy for two decades, and management is complicated when there is no public consensus on the land use allocation of a roadless area.

The indicators of the roadless issue are appropriate because they come directly from the Wilderness Act and are the same measures used by the Forest Service (and to a degree, Congress) to analyze a roadless area's eligibility for wilderness. They therefore best portray an area's condition for potential wilderness and the effects of a development alternative on that condition.

Manageability is another important criterion for potential wilderness. However, because it does not vary by action alternative in this analysis, it is not used as an indicator.

ROADLESS CHARACTER

The term "roadless character" refers to an area of at least 5,000 acres, without developed and maintained roads, and substantially natural. Roadless areas have varying degrees of wilderness characteristics. Wilderness is defined in the Wilderness Act of 1964 (P.L. 88-577); one requirement is a roadless, undeveloped condition.

Roadless condition can be and is viewed by some as a resource worth protecting in its own right. For example, recent studies have found that roadless areas provide elk security areas, and that hunting in an area with no roads strongly added to the elk hunting experience of 44 percent of elk hunters (rifle) in Idaho (McLaughlin 1989). Therefore, effects of alternatives on roadless character and wilderness potential are of public concern.

ROADLESS ANALYSIS BACKGROUND

Although the French Creek/Patrick Butte Roadless Area was not recommended for wilderness in the Forest Plan, it still possesses a roadless condition and still meets the basic criteria for potential wilderness. Project planning such as this EIS need not analyze a wilderness alternative for roadless areas allocated to non-wilderness in the Forest Plan. However, it must analyze impacts on the roadless condition and wilderness potential.

Any roadless area retaining wilderness qualities at the end of this Forest planning period will be re-evaluated for wilderness in the next planning period (unless Congressional or other national direction requires otherwise).

For information on the history of roadless area analysis nationally and on the Payette, including RARE II, the Forest Planning process, and the 1989 inventory boundary adjustments, see Appendix F, Roadless Analysis. Appendix F also discusses the 30-acre inventory adjustment made in the Hazard Helicopter planning area during this project analysis.

Wilderness Attributes

The Forest Plan FEIS, Appendix C, analyzed wilderness potential in terms of eight wilderness attributes in the 1964 Wilderness Act. The first four are required attributes:

1. Natural integrity
2. Natural appearance
3. Opportunity for solitude
4. Opportunity for primitive recreation

The second four are supplementary attributes (special features):

1. Outstanding ecological features
2. Outstanding geological features
3. Outstanding scenic features
4. Outstanding historic/cultural features.

The following discussion regarding the Hazard Helicopter planning area is organized by the four required attributes, plus special features. For a description of the entire French Creek/ Patrick Butte Roadless Area, see Appendix F.

HAZARD HELICOPTER PLANNING AREA

The planning area is 4,141 acres, 3,350 of which are roadless. This comprises about two percent of the entire roadless area. The discussion below refers only to the roadless portion.

Natural Appearance

The planning area appears highly natural. The area is too steep for cattle grazing, and sheep trailing through the area each summer leave light impacts. Three system trails pass through the planning area, and carved wooden trail signs mark one of the trailheads, the Hard Creek Trail. The southwest corner of the planning area was lightly logged decades ago, and indistinct stumps and old logging trails are faintly visible. Only outside the canyons and at the higher elevations are views beyond the planning area possible. To the west some partially harvested slopes on private land are visible. The slope north of Hazard Creek has been harvested with partial cuts and clearcuts visible from the highest elevations to the south.

Natural Integrity

The area's natural integrity is high. The steep areas are seldom visited by humans and have not been modified by management. The old logging in the southwest corner represents the major exception; valuable trees were selectively removed, leaving a younger more open stand. Fire suppression has allowed some of the forests to move toward two-storied stands with an old-growth pine and Douglas-fir overstory, and a Douglas-fir and grand fir understory. There is less of a fire mosaic pattern than would be expected under historic fire frequencies. In

places, large Engelmann spruce along riparian corridors have died from the recent bark beetle infestation. Sounds of traffic, logging, or other human activities are not heard unless originating from nearby to the west or north, where commercial timber harvesting occurs. The lack of public access has helped minimize human visitation and its effects.

Opportunities for Solitude

The level of solitude remains high throughout the planning area. By itself, the long, narrow rectangle offers a steep west-facing strip of seldom-visited land. Especially away from the three trails, solitude is easily found. The nearly continuous tree cover, steep topography, lack of destination features, lack of legal public access, and moderately remote location combine to provide substantial opportunities for solitude. The main scenic attraction, Hazard Falls, is impressive but difficult to observe with a clear view. Few people recreate in the area. Two of the three trails mainly take the visitor through the planning area to greater attractions at higher elevations to the east. The planning area lies along the western edge of a large roadless area, which greatly enhances the solitude in the planning area. Except for occasional airline jet sounds and logging equipment noises, the quiet enhances the area's outstanding solitude.

Opportunities for Primitive Recreation

The chances for primitive outdoor recreation are very good. The steep topography limits most travel, and the three trails receive the most use. The forest vegetation, scenic vistas at high elevations, presence of major cold streams, fisheries, big game and other wildlife present, choice of three trails, and suitable campsites in the southwest combine to offer good opportunities for diverse activities. These include big-game hunting, fishing, hiking, horse riding, backpacking, camping, photography, and nature study. The area is fairly distant from McCall but nearer to New Meadows and Riggins, and very convenient to Pinehurst a few miles north. Not so much a recreation destination in its own right, it provides access to high country roadless recreation and a series of three scenic lakes to the east, including Morgan Lake just above the planning area boundary.

Special Features

On wet slopes near Hazard Creek are several stands of paper birch, unusual this far south. Hazard Creek is a steelhead trout and chinook salmon fishery.

ENVIRONMENTAL EFFECTS

Changes to roadless character involves many environmental components. Important components of roadless character include fisheries, wildlife, visual quality, and biological diversity. This chapter discusses such values under the sections for those resources. The recreation section, particularly the recreation opportunity spectrum (ROS) portion, describes the effects on primitive recreation and is especially pertinent to roadless character and wilderness potential.

This section describes effects two ways. The first way is objective quantification in terms of acres developed and roaded and therefore made unsuited for future wilderness consideration. The second way is narrative, with reference to the five types of wilderness attributes described above and listed as indicators.

About 3,350 acres of the 4,141 acre Hazard Helicopter planning area are roadless. All discussion of effects on roadless character/wilderness potential below refers only to this roadless portion.

EFFECTS COMMON TO ALL ACTION ALTERNATIVES

In all alternatives, other approved activities can and would continue, such as permitted cattle grazing, hunting, motorbike use, and other dispersed recreation.

Direct Effects

Directly, the timber harvesting would change the biological aspects of the land—the vegetation and wildlife habitat. There would be less old-growth habitat and therefore reduced populations of old-growth dependent species. The modified setting would heighten the sensation of being in a developed area. The character of the landscape (the recreation setting) would change because the sights and other reminders of humans are present.

Visitors seeking a primitive experience would be less likely to visit these areas; visitors seeking a modified setting would increase. The Forest Service would categorize the harvested area as developed and would delete it from the inventoried roadless area.

Indirect Effects

The activities would also have indirect effects in the vicinity of development. The sights of harvested areas and helicopter landings would be noticed some distance outside the planning area within the boundary of the roadless area. This effect could make the new perimeter of the roadless area unsuited for wilderness recommendation and could scale back a potential wilderness boundary further inward.

Direct and indirect effects both would make it unlikely that Congress will further consider the affected areas for inclusion into the National Wilderness Preservation System. Development essentially disqualifies an area from future wilderness for the foreseeable future.

The **special features** of paper birch and anadromous fisheries would see no direct or indirect effects from timber sale activities under any action alternative.

Manageability

Manageability is an element of wilderness potential. The three action alternatives for this sale would have little effect on the degree to which the remaining roadless area could be managed as wilderness. It would reduce the size of the potential wilderness commensurate with its acreage. Logical boundaries could follow the eastern sale boundary, and the east-west portion of creeks in the planning area, such as Bascom and Hyatt Creeks.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

Table 3-18 shows the acres and percent of the roadless area that would be removed from, and the acres remaining eligible for, future wilderness consideration, by alternative. Figure 3-17 illustrates the developed area by alternative.

Figure 3-17. Roadless Consequences in the Planning Area by Alternative

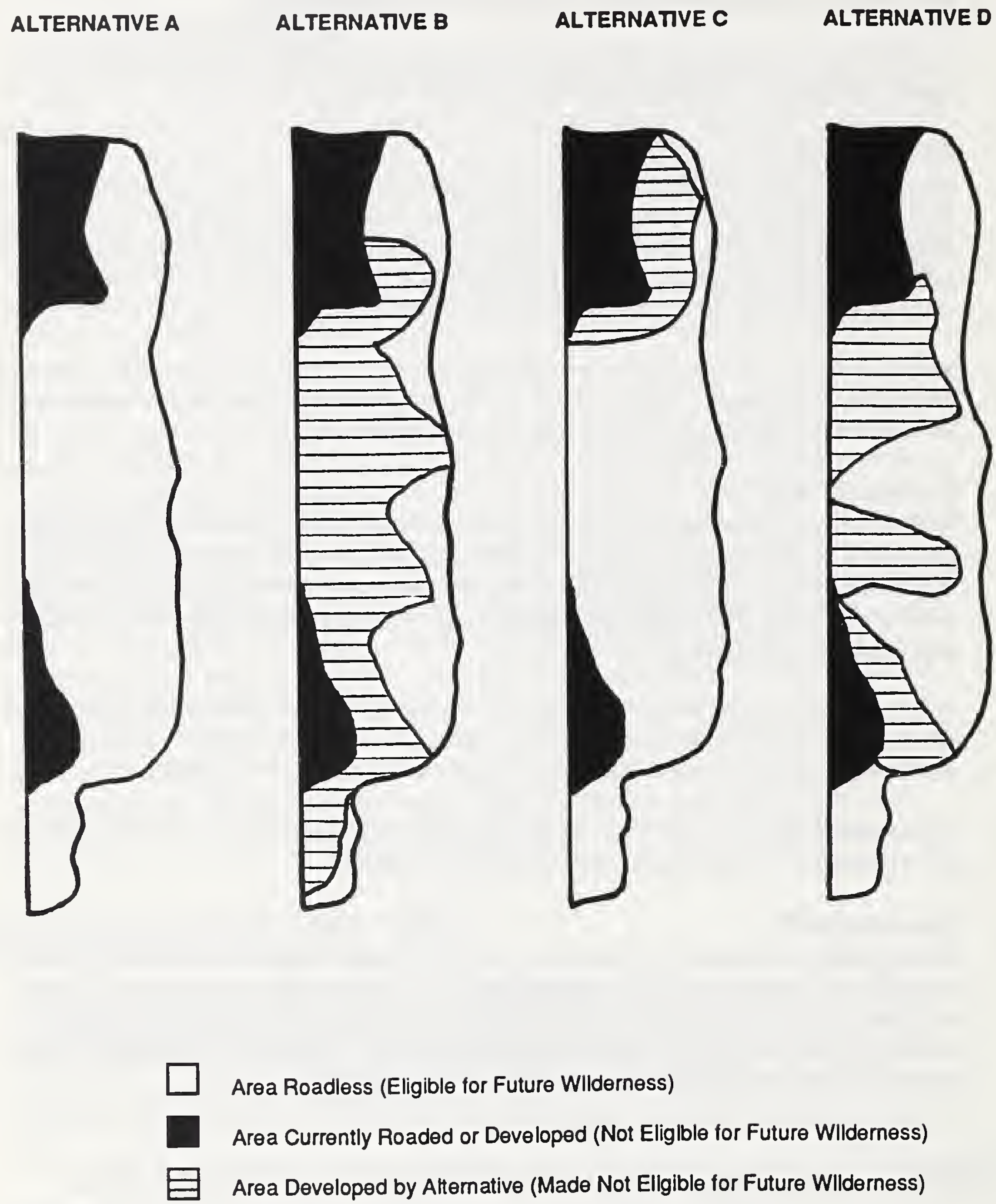


Table 3-18. Roadless Consequences for Hazard Helicopter Proposed Sale

	Current	Alt. A	Alt. B	Alt. C	Alt. D
Acres Removed from Future Wilderness Consideration:	---	0	2,300	520	1,400
Acres Eligible for Future Wilderness Consideration:	3,350	3,350	1,050	2,830	1,950

Alternative A

This alternative would not develop any of the 3,350 roadless acres. Therefore it would have no direct, indirect, or cumulative effects on roadless character or wilderness potential. The present levels of **natural appearance, natural integrity, opportunities for solitude, opportunities for primitive recreation,** and **special features** (grey birch, and anadromous fisheries) as described above would remain, affected mainly by natural processes.

Alternative B

This alternative would place 10 shelterwood helicopter harvest units totalling about 800 acres scattered throughout the roadless portion. The units would modify **natural appearance** and **natural integrity** substantially. The overstory removal prescriptions would not be visible from a distance. But stumps and slash and a more uniform stand of younger trees would be apparent within the units. A salvage-sanitation unit would lie across Trail 163, from which some stumps and slash would be visible. **Opportunities for solitude** and **opportunities for primitive recreation** would be reduced along the trail and throughout the planning area, and would not return for the foreseeable future. The roadless acreage in the planning area would decrease by about 69 percent.

Alternative C

This alternative would place a 33-acre clearcut and three shelterwood helicopter units totalling 120 acres in the roadless portion along Hazard Creek. The overstory removal prescription would leave stumps and slash but would not plant trees. Although the changes would not be apparent from a distance, within the harvest units the **natural appearance** and **natural integrity** would be reduced for the foreseeable future, as would **opportunities for solitude** and **opportunities for primitive recreation.** The roadless acreage would decrease by about 16 percent.

Alternative D

This alternative would place eight uneven-aged helicopter units totalling over 500 acres in the roadless area. **Natural appearance** and **natural integrity** would be modified by the stumps and slash in the units. Re-entries to remove additional timber would create further small openings. They would be apparent at close range but less visible from medium range. A salvage-sanitation unit would lie across Trail 163, from which some stumps and slash would be visible. **Opportunities for solitude** and **opportunities for primitive recreation** would be eliminated in and near the harvest units and would not return in the foreseeable future. The roadless acreage would decrease by about 42 percent.

CUMULATIVE EFFECTS

Past Roadless Sales

Occasional timber sales on the edge of the French Creek/Patrick Butte Roadless Area since the first roadless inventory in 1973 have developed and removed several thousand acres from wilderness eligibility. The most recent are the Hendricks and Brush Creek spruce salvage sales (1992).

Proposed Roadless Sales

Total Effects The six proposed sales in the roadless area—Fourmile, Freight Landing, French Creek, Hazard Helicopter, Jenkins, and Lower Elkhorn—would affect, at most, a projected total of 15,760 acres or 10 percent of the roadless area. They would leave a large area (at least 146,000 acres) still eligible for wilderness. Three sales lie along the perimeter of the roadless area and three lie in the interior. The interior three--French Creek, Jenkins, and Lower Elkhorn--would be major incursions into the heart of the roadless area. In total, 90 percent of the roadless area would retain its roadless character and wilderness potential.

Outyear Sales

The five outyear sales in the roadless area would develop another 9,350 estimated acres, or 6 percent of the roadless area. A roadless area of about 137,000 acres would remain. A larger area surrounding these sales would be indirectly affected by visible and audible reminders of development nearby.

Cumulative Effects

Cumulatively, all proposed and reasonably foreseeable sales together would reduce the size of the roadless area and therefore the extent of its wilderness potential by up to 25,000 acres or 16 percent. This includes both direct and indirect effects.

Developing the unroaded portions of the Jenkins and Lower Elkhorn planning areas would essentially remove the narrow bridge between the French Creek and the Patrick Butte sections of the roadless area. This would leave two smaller roadless units of about 70,000 and 67,000 acres for future wilderness consideration.

Most of these cumulatively affected acres lie within the area proposed for wilderness in the Idaho Wilderness Coalition's wilderness proposal. They include the Freight Landing, French Creek, Hazard Helicopter, Jenkins, and Lower Elkhorn planning areas.

In addition, it is reasonably foreseeable that additional timber sales will be planned in the roadless area's suited timber land (Management Areas 11 and 12) in future Forest Planning cycles. Specific actions, however, have not yet been proposed and cannot be analyzed. These sales would also lie within the area suggested by some for wilderness.

FOREST PLAN CONSISTENCY

None of the alternatives is inconsistent with the Forest Plan. The Plan allocates most of the sale area to a semi-primitive recreation setting, allowing limited forest management including low-intensity timber harvest. Because the action alternatives move toward this desired future condition (Alternatives B, C, and D), they can be seen as more consistent with the Forest Plan. Alternative A retains roadless and undeveloped areas and makes no progress toward this desired future condition.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

Roadless character and wilderness qualities are essentially non-renewable resources. Any development of a roadless area is an irretrievable commitment of the resource to non-wilderness condition for the long-term. In addition, because the natural processes of recovery and succession move so slowly, such development would also represent an irreversible impact within our lifetimes. Developed portions of the planning area would be disqualified from future wilderness consideration for the foreseeable future. The action alternatives (B, C, and D) would have this effect. Alternative A (No Action) would not.

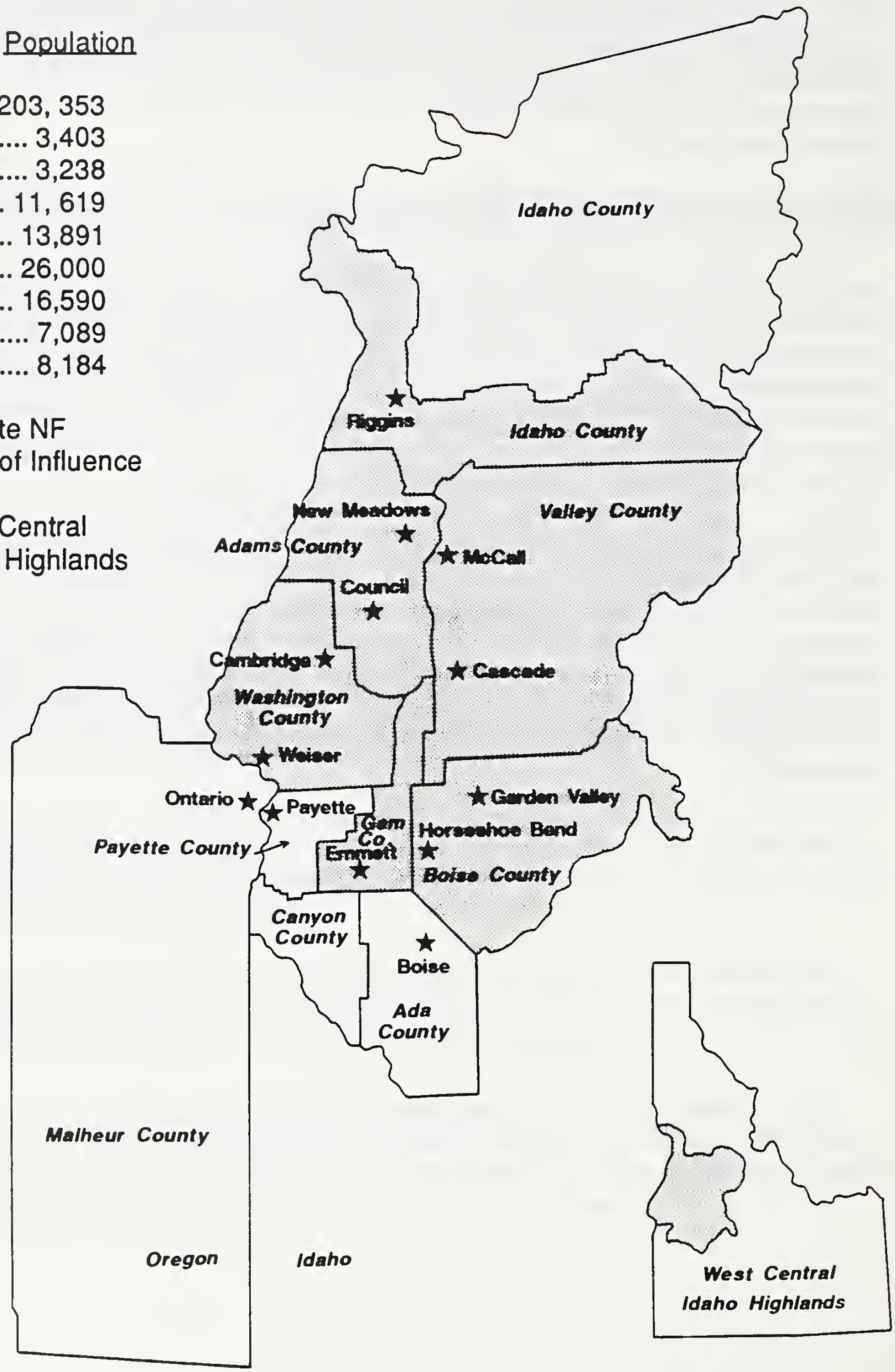
Theoretically, if no further development occurred, the area would gradually restore itself to sufficiently natural appearance some day to become eligible again for wilderness. This has occurred within a century in the case of several National Forest areas in the eastern U.S. that were once cut over but are now designated wildernesses. However, restoration could take longer in the steeper, drier conditions in the northern Rockies, depending on the degree of development. Road building on steep slopes, for example, can have long-lasting impacts. Thus, the impact of developing this roadless area with timber harvest would be essentially irreversible.

Figure 3-18. Payette National Forest's Zone of Influence and the West Central Idaho Highlands

County	Population
Ada	203, 353
Adams	3,403
Boise	3,238
Gem	11, 619
Idaho	13,891
Malheur	26,000
Payette	16,590
Valley	7,089
Washington	8,184

Payette NF Zone of Influence

West Central Idaho Highlands



Economics, Socio-Economics, and Social

Issue: The issue is the economic, socio-economic and social effects of the timber sale.

Indicators:
- **Present Net Value (PNV)**
- **Jobs and Income**
- **Payments to the counties**
- **Social conflict**
- **Social influence exerted to resolve conflict.**

FOREST PLAN DIRECTION

The timber section of the Forestwide standards and guidelines commits the Forest to choose, "[t]he most cost effective mix of logging system, road development, and silvicultural prescription that meets the land management objectives in the long run ..." (page IV-65). Additionally, it has been Forest Service policy to provide for net public benefits nationally while also assisting local communities that depend upon outputs from the National Forest. The economic effects of Forest management on communities was an important issue in developing the Forest Plan of 1988. The Forest Plan has no explicit direction on social effects.

DESIRED FUTURE CONDITION

The Forest Plan does not describe a desired future condition for economics, socio-economics, or the social environment. The interpreted desired future condition for economics and socio-economics is to maintain existing local community employment and income levels in the timber and range economy, and to provide an opportunity for growth in recreation employment and income. An interpreted desired future condition for the social environment is a stable, productive, and sustainable relationship between local communities and the Forest and its resources.

AFFECTED AREAS

The geographic areas most likely to be directly, indirectly, and cumulatively affected are the Forest's Zone of Influence, the West Central Idaho Highlands, and the communities within these areas (see Figure 3-18). Effects would occur outside the Highlands, but these effects would generally be so diffused and minor that they would be not be measurable. The Forest Plan FEIS (pages III-3 to III-13) gives a complete description of the social environment that may be affected by Forest management activities.

AFFECTED ENVIRONMENT

ECONOMICS

Present Net Value

In National Forest management, economic efficiency is usually measured in terms of present net value. Present net value is a project's discounted benefits less its discounted costs. To determine present net value, all costs of the project (support costs for timber, engineering, and other resource analysis) are subtracted from benefits that could result from a project (in this case, mainly timber and recreation values).

Economic benefits include both market and non-market values. Market values include revenues from timber, range, and developed recreation. Non-market values include activities that have monetary values assigned to them, such as hunting, dispersed recreation (outside developed sites), and wilderness use.

Not all Forest resources have an assigned monetary value. Although resources such as air quality, water quality, and non-game wildlife have value to people, no approved methodology is available to assign them a monetary value. The Washington Office of the Forest Service has authorized assigned monetary values only for those resources that are traded in the marketplace or have been market cleared (adjusted to reflect market transactions). The planning area has a present net value from existing uses: recreation and livestock grazing. This total is expressed by the No Action Alternative in the Environmental Effects analysis below. The commercial timber in the planning area represents a potential increase in present net value.

SOCIO-ECONOMICS

The Forest's wealth of natural resources has resulted in economic growth in local communities. Timber, recreation, and range form most of the economic base in the Zone of Influence. The Forest, through its management decisions, controls the level of resource outputs coming off the Forest, thereby affecting employment and income levels in Zone of Influence communities.

Timber-Linked Employment and Income

Recent research by Robison, Hormaechea, and Katzer (1989) showed that West Central Idaho Highlands sawmills processed 234.5 MMBF (million board feet) of timber in 1987. This provided 2,437 jobs and $103,385,000 in income in the West Central Idaho Highlands. Averaged out, each MMBF provided 10.4 (2,437/235.5) jobs and $440,874 ($103,385,000/234.5) in income. Table J-1 in Appendix J shows how this timber-linked employment and income was distributed among the West Central Idaho Highlands communities.

Not all timber processed at West Central Idaho Highlands sawmills came from the Payette National Forest. Of the 234.5 MMBF processed in the West Central Idaho Highlands, only 68.9 MMBF (29.4 percent) came from the Forest. The remainder of the volume came from state and private lands or other nearby National Forests. In 1987 the Forest's total harvest was 77.0 MMBF, with 8.1 MMBF being processed elsewhere, primarily northern Idaho, Montana, Oregon, and Washington. Using average jobs and income per MMBF, Payette National Forest timber provided 716.6 jobs (5.4 percent of all jobs) and $30,376,219 in income (5.4 percent of all income) in the West Central Idaho Highlands in 1987.

The timber volume planned in the Hazard Helicopter Timber Sale is part of the Payette National Forest's allowable sale quantity (ASQ) of 805 million board feet per decade. The Forest Plan directs that roadless timber volume will not be replaced by volume from roaded areas (page IV-51). If the sale is not offered, the Forest's planned volume for the year in which the sale was to occur may decline as a result. In turn, this may lessen the Forest's ability to meet its ASQ, which is a 10-year figure. This could affect the regional economy; changes in harvest levels translate into changes in logging employment and income levels. These changes, in turn, may affect linked employment and income.

Recreation-Linked Employment and Income

The Payette National Forest provides a wide spectrum of recreational opportunities—hiking,

hunting, and camping, to name a few. Forest recreationists, through their spending activity, generate employment and income in Zone of Influence communities. Table J-2 in Appendix J shows how this recreation-linked employment and income is distributed among West Central Idaho Highlands communities.

Some West Central Idaho Highlands communities are becoming more popular with a new type of recreationist: the retired, the leisurely, and the footloose. Like traditional recreationists, they bring outside money into the region, creating jobs and income. Unlike traditional recreationists, they maintain a permanent or semi-permanent residence in the area.

The roadless areas and vicinity offer many recreational opportunities. Any timber harvest activity may affect these opportunities, causing a corresponding increase or decrease in recreational activity. This change may lead to a corresponding change in recreationist spending, which would translate into a gain or loss of recreation-linked employment and income.

Range-Linked Employment and Income

The Forest provides rangeland used for grazing domestic sheep and cattle. Local ranchers and other members of the farming community, through the purchasing of goods and services, generate employment and income in Zone of Influence communities. Table J-3 in Appendix J shows how this range-linked employment and income is distributed among West Central Idaho Highlands communities.

The planning area provides suitable rangeland for domestic livestock grazing, both cattle and sheep. If changes in permitted grazing result from the proposed timber sale, then local employment and income levels could be affected.

Payments to Counties

Important to local governments is the money the Forest Service pays to each county instead of property taxes that might have been paid if National Forest lands were privately owned. These payments, calculated as 25 percent of gross receipts from the sale of National Forest outputs, are to be used by the counties to fund local schools and maintain and build roads. Timber usually generates the largest share of the payments. Table 3-19 shows the payments made to local counties resulting from 1991 Payette National Forest outputs. The size of the payment to each county is proportional to the percent of the National Forest lying within the county (not the level of outputs from each county).

Table 3-19. 1991 Payments to Counties by the Payette National Forest (In Thousands of 1991 Dollars)

County	Amount	Percent of Total
Adams	$442.0	17.6
Idaho	695.6	27.7
Valley	765.3	30.5
Washington	606.9	24.2
TOTAL	$2,509.8	100.0

SOCIAL

The issue is important because, to many people, social change represents either one of the major benefits or one of the major drawbacks of a timber sale. The indicators are good measures of the often unquantifiable impacts of government actions on society.

Society is the social environment made up of social groups, social values, and social systems. This EIS examines how the alternatives would affect each of these elements of society.

Social Groups

A **social group** typically pursues interests or goals that reflect its values. It pursues them by creating and/or using a **social system** to obtain the goals. The Forest Plan FEIS (page IV-116) identifies the following social groups in the Forest's Zone of Influence:

1. Loggers
2. Ranchers/farmers
3. Millworkers/laborers
4. Miners
5. Business people
6. Government workers/educators
7. Retired people
8. Younger newcomers
9. Native Americans

A group acts to expand its influence. If members perceive their group is threatened, they will often take social action(s) to resolve the perceived threat. Social actions to exert influence may take the form of publicity, media campaigns, polling, recruitment, fund-raising, coalition-building, appeals, lawsuits, negotiations, and many other activities.

Social Values

A **social value** is the basic building block of all opinions, customs, and traditions. Social values are more resistant to change than opinions, customs, and traditions. In the Forest's Zone of Influence, the population's social values closely resemble those of many rural communities. These attributes are (based on Carlson, Lassey, Lassey 1981, and others):

1. **Shared Ties.** Shared traditions and values, mutual trust, friendliness, concern for neighbors, family-centered living, and close ties to the land.

2. **Sense of Community.** Consistency between beliefs and actions; emphasis on local relationships, not money; self-reliance; informality in organizations, business, and personal relations; low social control; roots in the community; little desire to live elsewhere.

3. **Easy-Going Life-style.** Predictable, orderly pace of life; lack of pretense; difficulty in coping with change; wait-and-see attitude; fatalism; sense of resignation in face of urbanization.

4. **Resistance to Outside Forces.** Sense of encroachment by a foreign value system; sense of becoming a minority; skepticisms of outsider's motives; scapegoating behavior; a desire to organize to preserve the quality of life; inclination to fight fire with fire.

Interestingly, groups considered polar opposites often hold the same values. For example, both loggers and younger newcomers may be consistent in thought and actions, often favoring mutual trust, friendliness, a slower pace of life, informality, and close ties to the land.

Several studies have documented local social values. Lyle (1990) found that Valley County residents valued life-style, a small community, friendly people, low crime rates, and a quality natural environment. The priority goals were both quality of life and economic development.

Reid (1989) found that aesthetic factors such as water quality and natural beauty were very important to Idaho anglers. Idaho's major outdoor attractions to non-Idahoans were recreation, uncrowded conditions, quality of life, fishing, and scenic beauty (Idaho Department of Commerce 1991).

On the other hand, the New Meadows District Ranger believes that the values of Adams County residents are generally oriented toward natural resource production (David Spann, personal communication, 1992).

Groups act to maintain or expand the influence of their value system. If they perceive that their values are threatened, they will take action to oppose the threat.

Social Systems

Social systems are the institutions people use to achieve or validate their social values. The four types of social systems are: economic, cultural, political, and technical. A local city council or county commission is an example of a political social system. Generally, the economic system is the base that determines the nature of the other social systems. For example, a capitalist economic system typically generates a cultural system that is individualist, and a political system that is democratic.

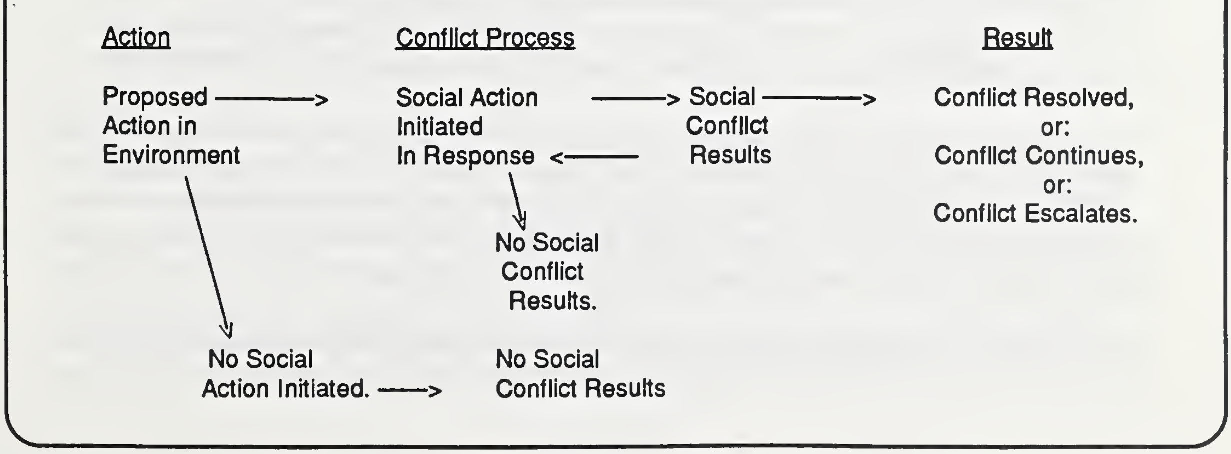
Groups act to maintain or expand the influence of their social systems. If they perceive their social systems are threatened, they will take action to oppose the threat.

For example, due to its local dependency on natural resource production, the residents of Adams County are beginning to struggle with other uses of natural resources, and conflicts are becoming more visible. Residents of Valley and Adams counties clearly articulated the nature of these conflicting values at the December 1992 town meeting on a proposed wilderness bill in McCall (USDA Forest Service 1992).

Social systems are more changeable than groups or values; they are the first place social changes will appear, such as those resulting from resource development proposals. Therefore, conflict is most likely when groups perceive a threat to a social system.

Figure E-2 shows the above social conflict model in simplified form.

Figure 3-19. Social Conflict Model



Appeals, litigation, and delays of roadless area timber sales throughout the West have been common in recent years; very few have been finally approved and harvested. Roadless sales are of great interest to the social groups in the local communities. Some timber-reliant towns, including New Meadows, Council, and Cascade, feel their sense of well-being and their life-styles threatened by potential reductions in available National Forest timber. People are fearful for their future (David Spann, personal communication 1993). For example, Adams County is currently undertaking a county planning effort to document its historic resource-based "custom and culture." Through this effort, the county intends to become more formally involved in National Forest land management decisions in the future.

Other communities, such as McCall and Riggins, do not perceive themselves as timber-dependent and value the life-style that a recreation-based economy provides. Such communities have environmental as well as economic concerns with roadless area sales.

As described in sociological studies throughout the West, the timber industry and the Forest Service strongly affect local communities. As observed by Kusel (1991):

> Mill closures, layoffs, and declining industry wages are shown to limit worker well-being, and that of their families and other community members, including some who are not involved with the timber industry. The result has been a decline in general community well-being and a reduction in the capacity of local communities (through the actions of residents) to improve it. This decline in community well-being and reduced capacity of communities may persist for decades.

Social conflict often increases as communities undergo economic and social transition. However, some communities have found ways to rebuild economically and restore their local well-being. Along with that renewal often come changes in land uses and life-styles.

DIRECT AND INDIRECT EFFECTS

ECONOMIC EFFECTS

Present Net Value

Economic analysis evaluates the costs and benefits of management alternatives to ensure economic efficiency is considered in developing and choosing a preferred alternative. This makes it possible to examine the economic trade-offs and consequences of each alternative.

The Forest Economist used the MTVEST investment analysis program to calculate the present net value of the alternatives. The analysis included all the costs (except overhead such as buildings and utilities) and benefits associated with the Hazard Helicopter timber sale. The methodology used for this analysis is consistent with that of the Forest Plan's FEIS, Appendix B, Sections VI and IX, which is hereby incorporated by reference.

The following costs and benefits were included in the present net value calculations:

COSTS

Sale Preparation	Sale Administration	Site Prep and Planting
Plantation Certification	Slash Disposal	Fuels Inventory
Fire Protection	Road Reconstruction	Road Maintenance
Road Closure	Lands Coordination	Fuels Coordination
Soil/Water Coordination	Visual Coordination	Range Coordination
Fish/Wildlife Coordination	Cultural Coordination	Recreation Coordination
Engineering Coordination	Allotment Management	Recreation Management

BENEFITS

Timber Stumpage	Dispersed Recreation	Big Game Hunting
Livestock Grazing Fees	Road Residual Value	

The costs and benefits were developed from the Forest Plan, FEIS, Appendix B, Section VI, the Forest Plan Cost Guide, and the Resource Pricing and Valuation Procedures for the Recommended 1990 RPA Program. Coordination costs include the costs of preparing this environmental document. Additional information on the MTVEST analysis is available at the Supervisor's Office in McCall.

Depending upon the emphasis of an alternative, each will vary in harvest volume, acres planted, etcetera. These differences result in differences in the present net value among the alternatives.

Even though the No Action Alternative harvests no timber, it has costs, benefits, and a present net value. The Forest manages livestock grazing and recreation in the proposed sale area, and these activities have economic values recognized in the MTVEST analysis.

Table 3-20 displays the present net value of each alternative for the Hazard Helicopter sale. All the alternatives have a positive present net value; meaning their benefits exceed their costs.

Table 3-20. Present Net Value by Alternative
(1992 Dollars)

	Alt A	Alt B	Alt C	Alt D
PNV	$266,000	$798,000	$393,600	$343,900

An important assumption underlies the figures in Table 3-20, and this assumption warrants discussion. The Payette Forest has traditionally used a stumpage value predictor equation to estimate the stumpage values used in calculating PNV. However, this equation is over ten years old and its predictive accuracy has greatly declined. The Payette is currently updating its stumpage predictor equation but it is not available for this analysis. To develop estimates for stumpage values in this analysis, the Forest Economist assumed a value of two-thirds of the 1992 average stumpage price, weighted by species volume. Two-thirds of the value was used

because this sale is a helicopter sale, and helicopter sales have historically sold for less than tractor or other ground-based yarding sales.

Timber sales with low value tree species, high road construction costs, or accessibility constraints (for example, a roadless area) can be costly to harvest. In some cases, the total cost of preparing such sales can exceed the revenues received for the timber. These controversial sales, often called "deficit" or "below-cost" sales, are of increasing national concern. Unfortunately, this controversy will not be easily resolved because it involves many complex relationships, such as accounting practices and the Forest's role in local economies.

Table 3-20 clearly shows that all the alternatives have a positive PNV, but it should be noted that the figures in Table 3-20 reflect the benefits and costs of *all* activities within the planning area, including those for which the Forest Service does not receive true market value (recreation, for instance). To see if the timber component of this sale would have a positive PNV, the Forest Economist modelled only those costs and benefits associated with timber, including coordination costs. These figures are displayed in Table 3-21.

Table 3-21. Present Net Value of Timber Only by Alternative
(1992 Dollars)

	Alt A	Alt B	Alt C	Alt D
PNV	$0	$532,200	$126,700	$79,600

All action alternatives would have a positive timber PNV, and therefore would not result in deficit or below-cost sales.

SOCIO-ECONOMIC EFFECTS

Effects on Timber-Linked Jobs and Income

The jobs and income effects of this timber sale depend upon who harvests the timber and where it is processed. If the timber is harvested and processed by West Central Idaho Highlands' loggers and sawmills, each million board feet (MMBF) of timber would support 10.4 jobs and $440,874 in income (see the Affected Environment discussion for an explanation of how these figures were derived).

Table 3-22 displays the timber volumes, jobs, and income associated with each alternative of the Hazard Helicopter sale. The job and income figures are expressed as annual averages for a ten-year period. For example, Alternative B would harvest some 7.1 MMBF; thereby supporting 7.4 jobs ((7.1 MMBF x 10.4 jobs) / 10 years) and $313,000 in income ((7.1 MMBF x $440,874) / 10 years) a year for ten years.

The figures in Table 3-22 assume that the timber would be harvested and processed by West Central Idaho Highlands' loggers and sawmills. If the timber were harvested by loggers outside the Highlands, or go to non-Highlands mills, then the job and income effects shown would not occur. It is also assumed that, if for whatever reason this sale is not sold, no volume would be substituted from other sources. If volume is substituted from other sources, then no

job and income losses would result.

Table 3-22. Jobs and Income by Alternative
(Jobs and Income for 10 years - 1989 dollars)

	Alt A	Alt B	Alt C	Alt D
Volume (MBF)	0	7114	2411	2962
Jobs	0	7.1	2.5	3.1
Income	0	$313,000	$105,800	$132,300

The No Action Alternative would provide no timber-linked jobs or income. Alternative B would provide the most jobs and income of the action alternatives, Alternative C the least.

Effects on Recreation-Linked Jobs and Income

Like range, current recreation use levels within the planning area boundary support less than one job. The action alternatives would affect the level of recreation use within the planning area, but the effects on recreation-linked jobs and income would be negligible.

Effects on Range-Linked Jobs and Income

The current level of grazing within the planning area boundary supports less than one job. Given that none of the alternatives would affect permitted grazing levels, there would be no effects on range-linked jobs or income.

Effects on Payments to Counties

Based on revenues expected from each alternative, Table 3-23 displays projected payments to the affected counties.

Table 3-23. Payments to Counties by Alternative
(1992 Dollars)

County	Alt A	Alt B	Alt C	Alt D
Adams	*	$30,000	$10,700	$12,900
Idaho	*	47,700	17,000	20,600
Valley	*	51,800	18,500	22,300
Washington	*	6,900	2,400	2,900
TOTAL	$100	$136,400	$48,600	$58,700

SOCIAL EFFECTS

The proposed timber sale would change neither social values nor social systems. It may affect social groups, but only in conjunction with other cumulative actions. The effects of just one timber sale, such as Hazard Helicopter, on the social environment would not be discernible. A project of up to 800 acres harvested, 7 million board beet of timber produced, seven jobs supported, and $313,00 returned to local counties would not be of sufficient magnitude to

cause change in the local or regional context. Social effects would only occur if the sale were considered together with other current and future actions.

CUMULATIVE EFFECTS

ECONOMIC EFFECTS

Present Net Value

The Hazard Helicopter Timber Sale is one of ten sales planned in the French Creek/Patrick Butte Roadless Area. Additional volume from future timber sales in this planning period (10 to 15 years) could come from the Freight Landing, Fourmile, Jenkins, French Creek, Lower Elkhorn, Elkhorn Lodgepole, Lake Creek Helicopter, Partridge Helicopter, or Beulah Butte sales. Volume from the French Creek/Patrick Butte Roadless Area is part of the total timber volume for the West Central Idaho Highlands timber industry.

The present net value calculations for future timber sales would be based on specific harvest unit information, information currently not available. Without these unit specific data, there is no way to calculate the present net value of these sales.

SOCIO-ECONOMIC EFFECTS

Jobs and Income

The cumulatively affected area is the West Central Idaho Highlands. Indirect effects would occur to suppliers and purchasers outside the Highlands, but these effects would be so minor that they would be immeasurable.

Table 3-24 displays the cumulative effects on jobs and income linked to the timber volume of the proposed sale and all proposed future sales. Job and income figures reflect the 10.4 jobs and $440,874 in income per MMBF discussed earlier. Income is stated in 1989 dollars.

Table 3-24. Cumulative Effects on Jobs and Income

Sale (Year)	Volume (MMBF)	Jobs per Year for 10 years	Income per Year for 10 years
Hazard Helicopter (1994)	7.0	7.3	$308,600
Freight Landing (1994)	6.0	6.3	264,500
Fourmile (1994)	4.0	4.2	176,300
Jenkins (1994)	5.0	5.2	220,400
French Creek (1994)	11.0	11.4	485,000
Lower Elkhorn (1995)	7.0	7.3	308,600
Elkhorn Lodgepole (1998)	5.0	5.2	220,400
Lake Creek Helicopter (1998)	6.0	6.3	264,500
Partridge Helicopter (1998)	7.0	7.3	308,600
Beulah Butte (1999)	12.0	12.5	529,000
TOTAL	70.0	73.0	$3,085,900

Roadless Sales

Timber volume from roadless areas accounts for approximately 30 percent of the Forest's allowable sale quantity of 80.9 million board feet per year. If some or all of the roadless volume is not harvested, the allowable sale quantity may drop by a comparable amount. This would cause proportional losses in jobs and income.

Since the Forest Plan was signed in 1988, no roadless area on the Forest has been entered for non-salvage logging, and only two sales have been analyzed and finally approved. This trend could have a substantial effect on the Forest's ability to meet its allowable sale quantity, and on jobs and income in local timber-dependent communities.

Roaded Sales

Sales in the roaded areas of the Forest account for approximately 70 percent of the Forest's allowable sale quantity. Future socio-economic effects assume these sales will be harvested and processed locally. If not, cumulative effects would occur proportional to the shortfall.

Future Sales

Other timber sales are reasonably foreseeable during the next 10 to 15 years, and beyond. If those sales are not implemented, the effects of job and income losses would compound as described above.

Other Sources

Other Federal, State, and private landowners or managers have timber scheduled for harvest. These sales are all part of the timber supply for West Central Idaho Highlands sawmills. Substantial reductions in one or more of these sources, along with reductions from the Payette, would cumulatively reduce local jobs and income further. Conversely, substantial increases in such sources would cumulatively increase job and income opportunities.

SOCIAL EFFECTS

Scientifically, the best way to measure social indicators is to conduct sociological surveys of people. Such surveys are prohibitively expensive and beyond the limits of this EIS analysis. Therefore, the social effects below are best estimates, based on knowledge of other surveys, Forest planning data, the local environment, and social trends in the Zone of Influence--all tempered by professional judgment.

When the Hazard Helicopter sale is combined and considered cumulatively with other reasonably foreseeable sales, it is likely that some social conflict and life-style changes would occur in the long term. Other sales include National Forest, Federal, State, and private timber sales. Possible social effects from other major development proposals, such as the proposed Valbois resort and major subdivision growth around McCall, are also part of the equation.

Possible cumulative effects from proposed timber sales on social groups and communities are:

- The proposals create conflict, which (with or without negotiation) is resolved; or
- The proposals create conflict, which (with or without negotiation) continues unresolved through time, and social polarization increases; or
- The proposals create conflict, which (with or without negotiation) escalates beyond the local

level to the regional level, and may go to the national level. Social polarization increases substantially.

The social conflict would manifest itself in one or more activities. In order of severity, they would include: information campaign, letter-writing campaign, publicity efforts, media campaign, recruiting other social groups as allies, administrative lobbying, appeal, political lobbying, lawsuits, and boycotts. Such actions, in turn, could generate counter-action by competing social groups.

The timber business cycle and the vitality of the national economy also affect the likelihood of social conflict. The current gradual recovery in both would tend to dampen conflict. Availability of retraining and alternate employment also lessens conflict.

If a cumulative decrease resulted from declining timber-related jobs and income, local life-styles would become relatively less oriented to resource development and more oriented to other life-styles, primarily recreation and tourism. Relative growth would occur in life-styles and social groups sharing a primarily esthetic relationship with the Forest, such as younger newcomers and retired people. Relative declines would occur in those life-styles and groups with a primarily economic relationship with the Forest, such as loggers and millworkers.

On the other hand, if timber-related jobs and income experienced a cumulative increase, an opposite effect would occur. Relative growth would occur in social groups and life-styles economically linked to the Forest, and relative decreases would occur in groups and life-styles esthetically linked to the Forest.

FOREST PLAN CONSISTENCY

ECONOMIC

This timber sale would meet the Forest Plan direction to consider the most efficient combination of management prescriptions to meet the objectives of the timber sale.

SOCIO-ECONOMIC

There is no Forest direction regarding socio-economic assessment; however, the Forest tries to maintain historic levels of jobs and income linked to timber and agriculture, while providing increased opportunity for recreation-linked jobs and income.

SOCIAL

Because the Forest Plan has no direction on social effects, no alternative would be directly inconsistent with the Plan.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS

ECONOMIC

The No Action Alternative represents an irretrievable loss of opportunity for an investment and associated revenue from the timber sale, but it would have no irreversible economic impacts.

The action alternatives would irreversibly and irretrievably invest in timber management and roads. Once invested, the funds could not be re-invested, although the investments could eventually result in returns to the U.S. Treasury.

SOCIO-ECONOMIC

Losses in jobs, income, and payments to counties in the alternatives with timber volumes below Forest Plan programmed levels represent irretrievable losses. Such losses assume that no replacement volume is available and that the sawtimber is processed at West Central Idaho Highlands mills. If the job losses change the local economy permanently, or if there is no replacement industry or employment realized, then the job and income losses may become irreversible.

SOCIAL

Alternative B would best contribute to maintaining current timber harvest levels, thereby maintaining the current mix of National Forest uses and life-styles of social groups. The other action alternatives contribute less to the life-styles of timber-dependent social groups. Alternative A would not contribute at all to those groups, but would contribute to the well-being of esthetic or environmentally oriented groups. Any loss for the social group would be irretrievable. In the long term, economies and social groups are resilient and can rebound and adapt. Therefore, no social changes would be completely irreversible.


J.A.

Minerals

Minerals was not raised as an issue for this project. The planning area was analyzed to determine what current mineral operations were active in the Hazard Helicopter planning area and what possible effects the proposed sale might have on them.

FOREST PLAN DIRECTION

Forest Plan direction for minerals primarily addresses mining activities. It directs that mineral exploration, development, and production be facilitated in an environmentally sound manner and these activities be integrated with planning and management of other National Forest resources (Forest Plan, page IV-99).

DESIRED FUTURE CONDITION

The Forest Plan has no explicit desired future condition for minerals. It can be interpreted as insuring the following:

Access is authorized where necessary for mineral development.

An operating plan will be obtained where significant surface disturbance is proposed and unnecessary impacts to surface resources will be minimized through inclusion of reasonable environmental protection measures.

Appropriate reclamation achieved for all mineral exploration and development.

AFFECTED AREAS

Mineral claims and access to them within the planning area would be directly, indirectly and cumulatively affected.

AFFECTED ENVIRONMENT

GEOLOGIC SETTING

The Hazard Helicopter Planning area is situated within the western edge of the Idaho batholith and comprised locally of deformed and metamorphosed intrusive rocks. The planning area is within the Hazard Creek complex, which ranges in age from early to late Cretaceous. Rock types include a variety of intrusive and gneissic rocks. Columbia River basalt and meta-sedimentary rocks are also present.

MINING HISTORY

There has been no significant mining activity within the planning area. Small placer workings are evident, but production was apparently small. Bureau of Mines records show two mica prospects were active near the area as early as 1940, but there is no known production. Seven active claims are within the planning area. No operating plans have been submitted. A map

and listing of the mining claims and their claimants are on file in the planning records.

MINERAL RESOURCES

In 1989, the Bureau of Mines conducted a study of the 210,000-acre French Creek/Patrick Butte study area to appraise the mineral resources. The Hazard Helicopter planning area is within this study area. The Bureau mapped and sampled significant mineral prospects and conducted a general reconnaissance of other prospects and mineralized sites in or near the study area. Results of the 1989 investigation were published in an open file report entitled, "Mineral Resources of the French Creek-Patrick Butte Study Area, Adams, Idaho, and Valley Counties, Idaho." No mineral resources or significant occurrences were identified. Other than small-scale placer gold, no mineral production is known or recorded.

DIRECT AND INDIRECT EFFECTS

Seven lode claims are located within Section 19 in the southern portion of the planning area. Alternatives A and C propose no activity near the claims and therefore would have no effect on them. Both Alternative B and D propose a shelterwood cutting unit in this area. No new road building is proposed and consequently no new access will be provided to the claims. However, road reconstruction is proposed, which will improve the existing access to the claims. If a right-of-way is secured through private and BLM land, legal access to Forest Service land will be provided. This will facilitate legal access to the claims. The claim owners will be contacted prior to timber marking to insure protection of claim survey markers.

CUMULATIVE EFFECTS

Past road building, current road reconstruction, and any future road building or maintenance would improve access or provide new access into unroaded areas and facilitate mineral exploration and development.

FOREST PLAN CONSISTENCY

All alternatives for the proposed Hazard Helicopter timber sale are fully consistent with Forest Plan Standards and Guidelines for minerals.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

No irreversible or irretrievable commitments would occur to the minerals resource as a result of the proposed Hazard Helicopter timber sale.

Roads and Access Management

Issue: The issue is the amount of roads reconstructed and how road access is managed both during and after the sale.

Indicators:
- **Miles of road reconstructed**
- **Miles or road open to public during and after the sale**
- **Number of right-of-ways obtained**

FOREST PLAN DIRECTION - ROADS

Transportation facilities will be planned, developed, and operated to provide for user safety, convenience, and efficiency. These facilities shall provide appropriate access to accomplish management direction and protection objectives (Forest Plan, page IV-113). For Management Area 10, no new road construction will be allowed (Forest Plan, page IV-251). All road reconstruction will meet, at a minimum, Payette General Standards for Local Logging Roads.

FOREST PLAN DIRECTION - ACCESS MANAGEMENT

Provide appropriate access on roads, trails and areas that is compatible with management direction, protection objectives, considers public safety, and minimizes conflicts with other users (IV-118). Standards and guidelines for wildlife further direct that access will be restricted between major scheduled timber sales. During active timber sales, only roads necessary for timber management activities will be open (IV-32). The Forest Plan Access Management Map outlines general access management direction for the Forest. Each year the Forest prepares an annual Forest Travel Map that sets site-specific direction on permitted and restricted access for roads, trails, and areas.

DESIRED FUTURE CONDITION - ROADS

In 30 to 50 years, the Forest will have a complete transportation system in place to support land and resource management (Forest Plan, page IV-114).

DESIRED FUTURE CONDITION - ACCESS MANAGEMENT

There is no stated Desired Future Condition for Access Management in the Forest Plan. Access management is updated annually through the Forest Travel Map.

AFFECTED AREAS

For both roads and access management, the areas that may be directly affected are the existing and proposed road systems in the sale planning area. The areas that may be indirectly and cumulatively affected are the road systems in and near the planning area (Figure 2-1).

AFFECTED ENVIRONMENT

ROADS

The planning area is approximately 14 miles north of New Meadows on Highway 95, and east along the Hazard Creek Road (287) about 3 miles.

There are two Forest roads in the Hazard Helicopter planning area. The Tepee Springs Road (288) enters the northern portion of the area and is a well-maintained logging road. The Hard Creek Road (250) enters the southern portion of the planning area and is not currently well maintained. Helicopter landings are proposed adjacent to both roads. In addition, there are two roads off National Forest land that could be used to access helicopter landings. One is a gated private road up the Hazard Creek drainage, and the other is an existing (blocked) private logging road up the ridge between Hazard and Hard Creeks. Both end at the Forest boundary. The Forest would have to obtain right-of-ways across BLM and private land in order to access many of the potential helicopter landings.

ACCESS MANAGEMENT

The planning area is in Management Areas 10 and 11. The Forest Plan directs that no new roads will be constructed in Management Area 10 (page IV-251). The Forest Plan Access Management Map established most of the Hazard Helicopter planning area as Area 3; motorized use is restricted to two-wheeled motorized vehicles except as specified on the annual Travel Map. More information on the transportation plan for the area is available at the Supervisor's Office in McCall, Idaho.

ENVIRONMENTAL EFFECTS

Roads and trails are used to help achieve the desired future condition of the managed Forest. Roads provide access to manage suited timber land and to public recreation opportunities. Roads have effects on natural resources, and those effects are described in the affected resource sections. The following discussion describes the changes to roads and access that would occur under the alternatives.

DIRECT AND INDIRECT EFFECTS BY ALTERNATIVE

ROADS

Miles of Roads Constructed and Reconstructed

No new road construction would be needed for this sale. Road reconstruction on the acquired right-of-ways would reduce erosion and improve safety on the existing roads.

Alternative A would reconstruct 0 miles of existing road.
Alternative B would reconstruct 6.5 miles of existing road.
Alternative C would reconstruct 1.2 miles of existing road.
Alternative D would reconstruct 6.5 miles of existing road.

ACCESS MANAGEMENT

Number of Right-of-ways Obtained

All action alternatives would require the Forest Service to obtain right-of-ways across private and BLM land. These right-of-ways would provide access to National Forest land and helicopter landings to be used for timber harvest. The right-of-ways would also provide public access to National Forest land and trails (see Recreation section, Trails).

Alternative A would require no right-of-ways for this project.
Alternatives B and D would require right-of-ways on three sections of road:

1. Existing road up Hazard Creek to Forest boundary,
2. Existing road up Hard Creek, and
3. Existing road to Grass Mountains Trail at Forest boundary.

Alternative C would only require right-of-ways on the road up Hazard Creek.

Miles of Road Open to Public During and After Sale

Assuming right-of-ways are obtained for the various alternatives, access management of these roads becomes a joint Payette Forest/BLM responsibility. The following describes the access management the Forest Service recommends:

1. **Hazard Creek Road** - this short (0.9 mile) piece of road to the Forest boundary would be reconstructed to Payette Forest standards in all action alternatives. It would remain open to the public except for possible seasonal closures as determined in the annual Forest Travel Plan. This road would provide public access to Trail 317 to Hazard Falls and beyond.

2. **Hard Creek Road (250)** - in Alternatives B and D, this road would be reconstructed to reduce sediment into Hard Creek. After the sale it would remain open to the public except for possible seasonal closures to be determined in the annual Forest Travel Plan. This road would provide public access to the lower Hard Creek drainage and Trail 164.

3. **Grass Mountains Road** - this steep road would be reconstructed in Alternatives B and D to reduce erosion concerns (see Chapter 2, Mitigation). After harvest this road would be closed to public motorized access and serve as an extension of the Grass Mountains Trail 163.

4. **Tepee Springs Road (288)** - this Forest road is well maintained and would need normal maintenance to provide access to the northern portion of the planning area. No right-of-ways are needed. This road would be used in all action alternatives. Public access is currently permitted and would remain as described in the Annual Travel Plan after the sale closes.

Table 3-25 shows the miles of road open to the public during and after the sale by alternative.

Table 3-25. Miles of Road Open to the Public by Alternative

	A	B	C	D
Miles of Road Open During the Sale	4.0	8.8	4.9	8.8
Miles of Road Open After the Sale	4.0	8.8	4.9	8.8

CUMULATIVE EFFECTS

ROADS

Forest Plan direction for Management Area 10 is that no new roads will be constructed. This policy will remain in effect at least until Forest Plan revision. It is likely to be continued.

In the long term, the road reconstruction and mitigation would reduce sediment and erosion currently occurring on these existing roads. **Alternative A** would not improve current conditions. **Alternatives B and D** would improve the roads in both Hazard Creek and Hard Creek drainages. **Alternative C** would improve the road in the Hazard Creek drainage only.

ACCESS MANAGEMENT

Under **Alternatives B, C, and D,** the new right-of-ways would allow public access to the Hazard and Hard Creek drainages. This access would increase recreation use in these areas.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS

Restricting public motorized access results in an irretrievable loss of some use in the area. To the degree that public vehicles are denied use of roads, that amount and duration of potential use is lost. In addition, roads and helicopter landings are an irretrievable commitment of the land they occupy. This is more fully described in the Soils section of this Chapter.

FOREST PLAN CONSISTENCY

All alternatives are consistent with the Forest Plan's management direction. Alternative A (no action) would defer public access, road reconstruction and maintenance for an indefinite time. Alternative C would defer public access, reconstruction and maintenance on the Hard Creek and Grass Mountains Roads.

Specifically Required Disclosures

This section contains disclosures of effects that are specifically required by federal law, regulation, or policy.

THREATENED AND ENDANGERED SPECIES

Consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service indicate that the Snake River spring/summer chinook salmon is the only federally listed threatened or endangered species occurring within the planning area. The direct, indirect, and cumulative effects upon this species are found in the Fish Habitat section in Chapter 3 of this EIS.

PRIME FARM LAND, RANGELAND AND FOREST LAND

All alternatives are in accordance with the Secretary of Agriculture Memorandum 1827 for prime farm land, rangeland, and forest land. Regardless of the alternative, National Forest System lands will be managed with sensitivity to any adjacent private and public lands.

The planning area does not contain prime farm land or rangeland. "Prime" forest land is a term used only for non-federal land, of which there is none within the planning area.

ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

Alternatives requiring the most road reconstruction and helicopter logging have the least potential for conserving energy. However, the energy required to implement any of the alternatives, in terms of petroleum products, is insignificant when viewed in light of production costs and the effect on the national and worldwide petroleum reserves.

EFFECTS ON THE HUMAN ENVIRONMENT

Local consumers could be affected by the supplies of commodities documented previously in Chapter 3; Economics, Socio-Economics, and Social section.

The civil rights of any American citizen, including women and minorities, are not differentially affected by implementation of any alternative.

WETLANDS AND FLOODPLAINS

There are some small wetlands and floodplains in the planning area. They would not be filled, because no road construction or stream crossings are proposed under any alternative. Because no fill or structures would be placed in either floodplains or wetlands, the intent of Executive Orders 11988 and 11990 would be met. This subject is documented previously in Chapter 3, Riparian Areas section.

Riparian ecosystems located within the planning area are protected and managed by Forest Plan standards and guidelines. In addition, specific mitigation measures and Best Management Practices are listed in Appendix H of this EIS.

UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Adverse effects on some components of the environment cannot be avoided. Actions to benefit one component may have at least temporary adverse effects on another. A broad range of alternatives has been formulated, and the alternatives include management requirements and mitigation measures to avoid or reduce adverse environmental effects. Monitoring will measure how effective the management requirements and mitigation measures are in reducing adverse effects.

SHORT-TERM USES OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE OF LONG-TERM PRODUCTIVITY

Short-term uses are those that generally occur on a yearly basis, such as livestock grazing as a use of the forage resource or timber harvest as a use of the wood resource. Long-term productivity refers to the capability of the land to provide market and amenity outputs and values for a 50-year period or longer. The quality of life for future generations is linked to the capability of the land to maintain its productivity.

For this proposed sale, management requirements and mitigation measures built into the action alternatives ensure that long-term productivity will not be impaired by the application of short-term management practices.

CONFLICTS WITH OTHER AGENCY GOALS AND OBJECTIVES

Research, interviews, and public involvement with other federal and state agencies indicate there are no other major conflicts between the provisions of the proposed action and the goals and objectives developed for other governmental entities.

Chapter 4

List of Preparers

Contents

Chapter 4
List of Preparers

This chapter lists the members of the Interdisciplinary Team, and others responsible for preparing this environmental impact statement, including significant background documents. Experience listed is as of April 1, 1993.

INTERDISCIPLINARY TEAM MEMBERS

Leigh Bailey - Hydrologist
BS Geology; 4 years Forest Service employment in hydrology and watershed management. Assisted with watershed and GIS analyses, prepared minerals analysis for Draft EIS.

Michael Balboni - Team Leader
BS Wildlife Ecology; 15 years Forest Service employment; 10 years as a wildlife biologist and 5 years as a resource assistant and team leader. Served as team leader for Draft EIS, coordinated range analysis.

David Ede - Writer/Editor
BA English; 13 years Forest Service employment in timber, recreation, and planning. Served as writer/editor for Draft EIS, coordinated maps and figures.

Jim Fitzgerald - Hydrologist
BS Soils and Watershed Management; 7 years Forest Service employment in soils and hydrology. Prepared water and riparian area analyses for Draft EIS.

Rodney Jorgensen - Soil Scientist
BS Soil Science; 15 years of Forest Service experience in soil management and integrated resource inventories. Prepared soils analysis for Draft EIS.

Jim Rees - Wildlife Biologist/Ecologist
BS Wildlife Biology, MS Biology; 4 years Forest Service employment in wildlife biology, 10 years US Fish and Wildlife Service employment in biology. Conducted wildlife surveys and data analysis. Prepared forest dynamics, biological diversity, and wildlife analyses for Draft EIS.

Curtis Spalding - NEPA/Recreation Specialist
BA Geology; 15 years Forest Service employment, primarily in forest planning, timber, recreation, and minerals. Prepared Draft EIS assessments for cultural resources, recreation resources, social, roadless/wilderness; coordinated for economic and socio-economic analyses.

Dave Thom - Data Base Manager
3 years Political Science; 21 years Forest Service employment, primarily in timber and computer application. Forest GIS specialist. Database manager for EIS team.

Rich Uberuaga - Fisheries Biologist
BS Fish and Wildlife Management; 19 years professional experience. Prepared fish habitat analysis for Draft EIS.

Alan Wright - Forester
BS Forest Management; 23 years Forest Service employment, primarily in timber, silviculture, insects and disease, fire/fuels, and roads. Prepared Draft EIS assessments for timber, silviculture, insects and disease, and coordinated assessments for air, fire and fuels, and roads.

OTHER CONTRIBUTORS

Morgan Beveridge - New Meadows RD Fuels Specialist
14 years Forest Service employment in fire and fuels, prescribed burning, and wildlife management. Assisted with fire and fuels assessment for Draft EIS.

Michael Dixon - Transportation Planner
BS Civil Engineering, BS Forestry; 14 years Forest Service employment in engineering, forestry, and hydrology. Extended team member for transportation planning.

Scott Katzer - Forester
BS Forest Management; 2 years Forest Service employment in timber and economic analysis. Prepared economic and socio-economic analyses for Draft EIS.

Alma Hanson -Forest Botanist
MS Botany, PhD Science Education; 3 years Forest Service employment in riparian inventories and botanical surveys. Prepared plant biological evaluation.

Lee Jensen - Fuels Technician
21 years Forest Service employment in fire and fuels. Assisted with fire and fuels and air quality assessments for Draft EIS.

Colleen LeClair - Cartographic Technician
16 years Forest Service employment. Prepared maps and figures for Draft EIS.

David Myers - Supervisory Range Conservationist
BS Range Management; 13 years Forest service employment in range conservation. Prepared range analysis for Draft EIS.

Debbie Pearson - Forester
BS Forest Management; 7 years Forest Service employment in timber. Extended Team member for timber.

Line drawings by **Pete Amell**, artist and smokejumper.

Chapter 5

Public Involvement

Contents

Chapter 5
Public Involvement

PUBLIC INVOLVEMENT SUMMARY

Public involvement has been an important part of the process of developing the Environmental Impact Statement for the proposed French Creek/Patrick Butte timber sales. The Hazard Helicopter sale is one of six French Creek/Patrick Butte timber sales for which scoping was conducted simultaneously. The process began with "scoping" of issues in May 1989. Highlights of significant events follow. A full detail of documented meetings, telephone calls, written correspondence, and other communication is available in the planning records of this project.

It is important to remember that public involvement for potential timber harvest in this roadless area includes public comments received on the draft and final Payette Forest Plan. Extensive public involvement opportunities were available during this period and comments received during that period were reviewed by the roadless team.

Public involvement activities for this project analysis include public meetings, planning meetings open to the public, newsletters, newspaper supplements, field trips, consultation with other agencies and organizations, and interest group briefings.

CHRONOLOGY

May 1989 - The Forest published in local newspapers a newsprint flier inviting public participation in the EIS process. In addition, the flier was mailed to the Forest's mailing list, placed in strategic community locations, and made available at public meetings.

May-June 1989 - Public meetings were held in McCall and Boise inviting comment to generate issues and concerns for the roadless team's analysis. Over 100 people attended these meetings. The format included a briefing by the roadless team, small group discussions, and individual discussions. During this time period, a 30-day written comment period invited submission of additional issues. The roadless team received 140 pieces of written input and several dozen oral comments as a result of this public involvement step.

June 1989 - A Notice of Intent to prepare an EIS appeared June 9, 1989, in the Federal Register.

September 1989 - The roadless team issued Newsletter Update #1, listing the issues developed from public input and giving summary background information.

November 1989 - The roadless team issued Newsletter Update #2, giving further information on the process, describing proposed alternatives, and previewing upcoming public meetings.

November 1989 - The public was invited to attend a full Interdisciplinary (ID) Team meeting to watch the review of proposed alternatives. The November 6-7 meeting had several interested citizens in attendance.

November 1989 - The Forest held public meetings at Riggins, New Meadows, Boise, and McCall. The purpose was to update citizens on the planning process and to present proposed alternatives. Following these presentations, the roadless team invited comment on proposed changes, proposed new alternatives, and any other ideas. Small group discussions led to some variations in the alternatives. Over 100 people attended the meetings.

December 1989 - The roadless team issued Newsletter Update #3. It summarized the results of public alternative meetings and public involvement ideas.

January 1990 - The Payette Forest held a coordination meeting with Idaho Department of Fish and Game.

January 1990 - The Forest sponsored an uneven-aged timber management seminar. Over 100 people attended the full-day event. The meeting was conceived and suggested by the roadless team as a way to explore more fully and openly the advantages, disadvantages, and impacts of uneven-aged timber management.

January 1990 - The roadless team presented a program to the McCall chapter of the Idaho Conservation League at its regular monthly meeting.

March 1990 - Roadless team members traveled to northern Idaho and eastern Washington and held briefings with the Nez Perce tribe, Inland Empire Public Lands Council, Intermountain Forest Industry Association, and Dennis Baird.

May 1990 - The roadless team mailed Newsletter Update #4, which updated readers on the schedule, alternatives and environmental consequences, results of the uneven-aged seminar, and other items. It advertised public field trips in the summer to proposed timber sales.

May-June 1990 - Team members and Forest staff held several meetings and briefings for interested groups.

August 1990 - The roadless team mailed Newsletter Update #5. It invited the public to field trips in September and gave updates on analysis progress.

Fall 1990 - Forest personnel held individual meetings and contacted residents along the Little Salmon River corridor. The purpose was to ensure that adjoining residents were aware of the proposed timber sales and analysis efforts. Follow-up meetings were held with a few residents to discuss specific subjects, such as hydrology and wildlife.

January 1991 - The roadless team mailed Newsletter Update #6. It gave a further update on analysis efforts, including biological diversity.

November 1991 - The Forest published a revised Notice of Intent in the Federal Register notifying the public of the change in EIS title and schedule.

June 1992 - The roadless team mailed Newsletter Update #7. The newsletter updated the public on the schedule and activities involving the French Creek/Patrick Butte sales. It also contained a return postcard for the public to request whether to receive future information about the French Creek/Patrick Butte sales.

December 1992 - The roadless team mailed Newsletter Update #8. The newsletter updated the public on the schedule and activities involving the French Creek/Patrick Butte sales.

February 1993 - A revised notice of intent to prepare an environmental impact statement for the Hazard Helicopter timber sale is published in the Federal Register.

April 1993 - The roadless team mailed Newsletter Update #9. The newsletter informed the people on the roadless area mailing list of the decision to publish an EIS for each French Creek/Patrick Butte sale.

April 1993 - The roadless team sent out the Hazard Helicopter Draft EIS to the recipients listed in this chapter, requesting comments from the public.

CONSULTATION WITH OTHER AGENCIES

The ID Team consulted the following agencies during the analysis of this project:

Columbia River Inter-Tribal Fish Commission
Idaho Department of Fish and Game
Idaho Department of Lands
Idaho State Historic Preservation Office
Nez Perce Tribe of Idaho
USDA Nez Perce National Forest
USDC National Marine Fisheries Service
USDI Bureau of Land Management
USDI Fish and Wildlife Service

LIST OF RECIPIENTS

The following is a list of recipients to whom this Draft EIS has been sent. This is a base list composed of respondents to the June 1992 request for interest, required agencies, and involved parties. Additional copies are available upon request from the Supervisor's Office in McCall, Idaho.

BUSINESSES

Boise Cascade Corporation
    Pat Donivan
    David Van De Graaff
Brown Industries
    Judd DeBoer
Dale Q. Hall and Associates
Evergreen Forest Products
Ikola Logging Inc.
    Gerry Ikola
Keith Craft Aircraft Services
J.I. Morgan, Inc.
Pervernal Acres Arboretum
Star News
The Advocate
The Idaho Statesman
TVTMA

CITY AND COUNTY OFFICIALS

Adams County Commissioners
City of New Meadows
Idaho County Commissioners

FEDERAL AGENCIES

Agriculture, U.S. Department of:
    Forest Service:
        Boise National Forest
        Environmental Coordination, Washington, DC
        Intermountain Regional Office, Ogden, UT
        Nez Perce National Forest
        Soil Conservation Service
        Tri-Region Anadromous Fish Coordinator
Commerce, U.S. Department of:
    National Marine Fisheries Service, Portland, OR
Congressman Larry LaRocco
Environmental Protection Agency

Washington, DC Office
Regional Office, Seattle, WA
Interior, U.S. Department of:
Bureau of Land Management, Cottonwood, ID
Fish and Wildlife Service, Boise, ID
Jeri Williams
Office of Environmental Project Review
Senator Dirk Kempthorne
Senator Larry Craig

ORGANIZATIONS

Blue Ribbon Coalition
Adena Cook
Columbia River Inter-Tribal Fish Commission
Idaho Cattleman's Association
Idaho Conservation League
Mike Medberry
Idaho Sportsmen's Coalition
Ron Mitchell
Intermountain Forest Industry Association
Charlie Johnson
National Wildlife Federation
Nez Perce Tribe of Idaho
Northwest Timber Workers Resource Council
Ron Harrington
Steve Bliss
Western Forest Industries Association
The Wilderness Society
Craig Gehrke

STATE AGENCIES

Department of Health and Welfare:
Division of Environmental Quality
Mike McIntyre
Department of Fish and Game
Department of Lands
John Lillehaug
Department of Parks and Recreation
Chuck Wells
Office of the Governor, Cecil D. Andrus
State Historical Society

INDIVIDUALS

Rick Addison
Charles Anderson
Dennis Baird
Kurt Becker
James T. Bounds
Larry Bratcher
Howard Buettgenbach
David and Ann Cook
Angie Cossin
Robert Cusumano
L.L. Daniels
Rochelle Desser
Gordon D. Fagerstedt
Margaret Fuller
Roy Grossen
Loy R. Hollenbeak
Jim Johnston
Jerry Kooyers
John Kwader
Viki LaFay
Jim Lafferty
Cliff Lee
John Lewinski
John Madden
Jim McConnor
Bob Munsey
Jay P. Munsey
Tony Nash
Herald S. Nokes
Dautis Pearson
Larry Peterson
Quintin Phillips
Jeff Rohlman
Jim Rosetti
David Simmonds
John R. Swanson
Nelle Tobias
David Towner
Jim Thrash
Tom Tumelson, Jr.
Pete Walker
Peggy Weaver
Charles Wellner
Barry Whitehill
Bob Wing
Nolan Woods

PUBLIC LIBRARIES

Boise Public Library
McCall Public Library
New Meadows Public Library

Appendices

Contents

APPENDIX A
ANALYSIS ASSUMPTIONS

This appendix lists the assumptions used to develop and analyze the alternatives in this EIS. Most of the assumptions were developed for the economic effects model MTVEST and the sediment model BOISED. These assumptions were also used to estimate outputs and effects described in Chapter 3 of this EIS. See Appendix C, Glossary, for definitions of terms and abbreviations.

TIMBER ASSUMPTIONS

In developing alternatives to analyze for the proposed timber sale, the following sale scheduling assumptions were used for all alternatives. (Note that the first year is considered the sell year.)

Sale Duration

Length of sale (years) depends on the sale volume (MMBF = million board feet):

0-2 MMBF = 2 years
2-5 MMBF = 3 years
6-10 MMBF = 4 years

Harvest Activities Timing

Helicopter Logging
All harvest in same year.

Sale Administration
Starts the year of harvest, not the year of sale.

Road Reconstruction
All in year 1.

Slash Disposal
The year following harvest but all completed the year the sale closes.

Planting
The year following slash disposal.

Schedule of Sale Activities by Length of Sale

2 Year Sale
Year 1 - Sale sells
All road reconstruction
Year 2 - All harvest
All slash disposal
Sale closes
Year 3 - Plant
Year 4 - Complete planting
Roads closed (if applicable).

3 Year Sale
Year 1 - Sale sells
All road reconstruction
Year 2 - Complete harvest (all helicopter and skyline, and rest of tractor)
Year 3 - All slash disposal
Sale closes
Year 4 - Plant acres harvested in year 2
Year 5 - Close roads (if applicable)

4 Year Sale
Year 1 - Sale sells
All road reconstruction

Year 2 - Harvest all helicopter
Year 3 - Slash disposal
Year 4 - Complete slash disposal
Plant acres harvested
Sale closes
Year 5 - Close roads (if applicable)

Silvicultural Prescriptions

The following silvicultural prescriptions and formulas are used in the various Alternatives considered in this EIS. For a detailed description of the prescriptions, see Appendix G. The prescriptions should be used during sale layout and modified by a certified silviculturist only where site specific conditions indicate the prescription would not achieve the desired result. The formulas for each prescription are used with stand data to estimate Alternative volumes that might result from applying that prescription. The actual volumes produced from a sale may vary depending upon the final marking of the stand.

Each tree species varies in commercial timber value. The following species are considered low value (**LV**) in the prescription formulas: grand fir, subalpine fir, and lodgepole pine. High value (**HV**) species include: ponderosa pine, Douglas-fir, western larch, and Engelmann spruce.

Code	Prescription	Brief Definition and Volume Formula
CC or	Clearcut	Removal of 100% of all merchantable trees from cutting unit.
CC-RT	Clearcut - Reserve Tree	Removal of 100% of all merchantable species with these exceptions: Snags and selected reserve trees for wildlife and other resources may be left where appropriate. These may be of any size or species. Advanced regeneration that has the potential to grow into crop trees will also be retained where feasible.
SW	Shelterwood	Removal of all but a number of trees per acre (usually more than 15) for shade and often seed, visuals, wildlife, and/or other reasons.
SW1	Preparatory Cut	Removal of 80% of **LV** and 30% of **HV** trees.
SW2	Regeneration Cut	Removal of 100% of **LV** and 50% of **HV** trees.
SW3	Final Overstory Removal	Removal of 100% of all overstory trees (with the exception of selected wildlife reserve trees of any size or species).
UN	Uneven-aged Normal	Removal of individual trees and small groups of trees up to a maximum of 2-acre openings. Removal of 40% of **LV** and 20% of **HV** trees.
UA	Uneven-aged Accelerated	A heavier uneven-aged cut that combines individual tree and small group selection cuts up to a maximum of 2 acres in size. This accelerated cut will be prescribed where stand age and insect and disease conditions may not allow most trees to live through the rotation. Removal of 50% of **LV**

		and 30% of **HV** trees.
SS	Sanitation/Salvage	Removal of dead, dying, defective, and insect or disease-infested trees. Removal of 30% of all species.

Timelines for Silvicultural Systems

Illustrated below are the long-term schedule of activities for the different silvicultural systems: shelterwood, clearcut, and uneven-aged. The numbers along and below the horizontal line denote years from start of the cycle.

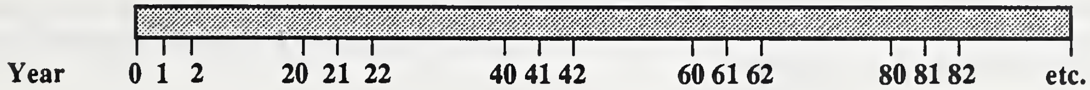
Shelterwood System

0	Shelterwood Cut
1	Slash Disposal and Site Prep the area for natural/planted regeneration
2	Planting (if needed)
15	Final Cut (Overstory Removal Cut)
90	End of Rotation, Shelterwood Cut

Clearcut or Seedtree System

0	Clearcut or Seedtree Cut
1	Slash Disposal and Site Prep the area for natural/planted regeneration
2	Planting (if needed)
15	Precommercial Thinning
60	Commercial Thinning
90	End of Rotation, Clearcut

Uneven-aged System



0	Uneven-aged Cut (Individual Tree or Group Selection) plus thinnings
1	Slash Disposal and Site Prep the area for natural/planted regeneration
2	Planting (if needed)

20, 40, 60, 80	Uneven-aged Cut (Individual Tree or Group Selection) plus thinnings
21, 41, 61, 81	Slash Disposal and Site Prep the area for natural/planted regeneration
22, 42, 62, 82	Planting (if needed)
etcetera	The 20-year cycle would continue harvesting approximately 1/5 of the trees in each cut.

Firewood - Both naturally occurring and generated by harvest activities.

The Forest will allow access for personal use firewood gathering in designated areas during specific periods during the life of the sale through post-sale activities.

For the Hazard Helicopter Sale, there would be firewood opportunities for the public at landing sites where slash would be piled for disposal. YUM piles could be sizeable, and firewood gathering would be encouraged once harvest activities are completed. About 2 cords of firewood would be available from each acre that is YUM yarded.

Planting

Estimated acres of planting by harvest method are:

CC	100% of the area harvested
UN/UA	20% *

* Because harvest in the Hazard and Hard Creek drainages would use only helicopter logging and uneven-aged prescriptions, most units in this area are planned to utilize natural regeneration.

Site Preparation for Natural Regeneration

The formulas used to estimate acres of natural regeneration by harvest method are, for all species:

CC	0% of the area harvested
UN/UA	10%

Survival Exams

All acres planted and all acres site-prepped for naturals will be examined and certified for regeneration success. Currently plantations are examined in the first, third, and fifth year after planting and then certified if Forest standards are met.

SLASH DISPOSAL ASSUMPTIONS

The following fuel treatment assumptions were used for the Hazard Helicopter sale alternatives. These estimates were prepared using harvest unit specific information from each alternative.

ALTERNATIVE A

No fuel treatment.

ALTERNATIVE B

Lop and Scatter	190 acres
Jackpot Burn	391 acres
YUM Pile and Burn	255 acres
Total	836 acres

ALTERNATIVE C

Lop and Scatter	105 acres
Jackpot Burn	39 acres
Broadcast Burn	33 acres
YUM Pile and Burn	28 acres
Total	205 acres

ALTERNATIVE D

Lop and Scatter	139 acres
Jackpot Burn	230 acres
YUM Pile and Burn	186 acres
Total	555 acres

SOIL ASSUMPTIONS

Roads

It is estimated that one mile of road is equal to four acres of soil resource commitment.

Landings

Helicopter landings

Estimate 2 acres per landing. The number of landings varies by alternative, but each identified landing is assumed to equal two acres of soil resource commitment.

Recreation Trails

It is estimated that one mile of system trail is equal to 0.73 acre of soil resource commitment. The acres totally committed by alternative for the Hazard Helicopter timber sale planning area are shown in the planning records.

WILDLIFE AND COVER ASSUMPTIONS

- Assume uneven-aged prescriptions will reduce cover for wildlife by 20 percent.
- Assume the length of time a sale is open follows TIMBER ASSUMPTIONS.
- Assume the entire sale area is open to motor vehicles for the sale period, except for the Grass Mountain Road.
- Assume timber harvest proceeds as shown in TIMBER ASSUMPTIONS
- Assume recovery of cover in clearcut units ten years after the sale closes.
- Assume habitat quality is higher ten years after the sale than it is before the sale because hiding cover is improved and forage quality is improved due to transitory forage created by timber harvest and grass seeding.
- Assume administrative use occurs on closed roads but disturbance to elk due to use is insignificant.

LIVESTOCK ASSUMPTIONS

AUMs (animal unit months) in the sale area are proportional to the percent of the suitable acres in the sale area vs. the total suitable acres in the grazing allotment. Example:

$$\frac{\text{Suitable acres in sale area}}{\text{Total suitable acres in allotment}} = \frac{\text{AUMs in sale area}}{\text{Total AUMs in allotment}}$$

- There will be no net change to permitted AUMs due to the proposed sales. Increased transitory range may become available.
- There will be no additional cost for moving/controlling sheep since the sheepherder is already there.
- Noxious weed control is included in costs if known populations are already present in the sale area.

ACCESS MANAGEMENT ASSUMPTIONS

As a result of considerable Forest Plan study and interpretation, and site-specific application, the following is the interpretation of desired future condition for access management within the French Creek/Patrick Butte Roadless Area.

- Existing roads and trails will be managed according to the annual Forest travel map.
- Seasonal hunting closures will be in effect during the sale.
- Public highway vehicle use is allowed during the operation period of the timber sales for firewood

collection purposes (Forest Plan, IV-50).

- Administrative and contractor use is allowed during and between sales following the established standards and guidelines in the Forest Plan (IV-119).
- Two-wheeled vehicle and ATV use will continue to be allowed on the trails presently designated for that use on the annual travel map.

Assumptions for miles and duration of road closures by alternative, as provided to the MTVEST economics model, are in the planning records.

ROAD STANDARD ASSUMPTION

Road construction in the roadless area will follow the "Payette General Standards for Local Logging Roads." The objective will be to minimize construction costs and negative impacts to the environment while providing for safety. Public safety features (such as higher design speeds and longer sight distances) will not normally be added to the designs. Safety features necessary for the timber operation will be included.

RECREATION, ROADLESS, AND VISUAL QUALITY ASSUMPTIONS

The methodologies for analysis of these resources and some basic assumptions are summarized in Appendix E, Recreation Analysis, and Appendix F, Roadless Analysis. The detailed assumptions by alternative for each sale are in the planning records.

WATER

- Follow all Forest Plan Standards and Guidelines except the 6-Step process for riparian area management.
- No changes will occur in Allotment Management Plans that will alter present management within the proposed project areas.
- There are no valuable minerals within the proposed project area that have development potential.
- All planned activities on lands owned or administered by other agencies or entities will occur regardless of the actions taken by the Forest on the proposed sales.
- Described BMPs, SSBMPs, and monitoring will occur if action alternative is implemented.

APPENDIX B
MONITORING AND EVALUATION PLAN

INTRODUCTION

This appendix outlines the program for monitoring and evaluating the implementation of the Hazard Helicopter timber sale.

Monitoring and evaluation are the control systems for implementation of the Forest Plan, including projects such as this. Monitoring collects data to show if the project's resource objectives have been met. Evaluation reviews monitoring results and determines what adjustments are needed. Monitoring and evaluation give the decisionmaker—and the public—information on the progress and results of implementing the activities described in this EIS.

The Payette Forest recognizes three broad types of monitoring: baseline (existing condition), project (such as timber harvests), and validation (of Forest Plan assumptions) monitoring. The high-priority monitoring for this project includes only project monitoring.

The two types of Project Monitoring are:

1. Implementation Monitoring. Asks if the project meets laws, regulations, policy, and Forest Plan standards and guidelines. "Did we do what we said we were going to do?"

2. Effectiveness Monitoring. Asks if the project's practices and mitigations meet the overall management objectives. "Did the practice/activity do what we wanted it to do?"

See Forest Plan, Chapter V, for more background on Forest-level monitoring.

Funding

Funding comes from several sources. While some comes from project KV (Knudsen-Vandenberg) collections, the Forest's annual budget is the main source. Annual monitoring plans will be prioritized based on annual budgets and program direction. Projects will not be implemented unless they can be properly monitored (Forest Plan, V-3).

Applicability

This monitoring plan applies to all alternatives in this EIS except A, No Action.

Evaluation of Monitoring Results

Evaluation of monitoring results can lead to further action at the discretion of those doing the evaluating—the ID Team, District personnel, District Ranger, or Forest Supervisor. Possible actions would include:

- no action,
- referring the problem to the District Ranger for improved application of the management practice,
- stopping the practice or activity,
- modifying the practice, either for the project (amended decision), or for the Forest (Forest Plan amendment),
- initiating a Forest Plan exception or amendment,
- revising the cost or output, or
- initiating a Forest Plan revision.

Forest specialists are to conduct yearly monitoring of the Payette Forest Plan accomplishments. The Hazard Helicopter timber sale monitoring should tier into this annual monitoring plan. The results of this monitoring would show the specialists' conclusions and recommendations in a clear, concise, usable form, and should include the following:

- a comparison of actual outputs, costs, and services with those projected in the EIS.
- documentation of any significant change in soil or timber productivity, or other resources,
- recommended changes in practices, mitigations, or monitoring, and
- needs for continuing evaluation, new direction, or new research.

Duration of Monitoring

How long should monitoring last? Results of the monitoring and evaluation will answer that. When there is no longer a question whether law, regulation, policy, standards, and guidelines are being met, monitoring of that element can cease. If, however, monitoring evaluations reveal that the requirements are not being met, management needs to intervene to correct the situation.

For example, sediment yield is to be monitored before and after the project. If sediment stays at acceptable levels over a period of years, monitoring of that element need not continue annually. But if results indicate sediment is excessive over time, then standards are being violated and management needs to restore sediment yield to acceptable levels. This is the "feedback loop" of monitoring and evaluation.

MONITORING AND EVALUATION TABLE

The table on the following two pages summarized the Monitoring and Evaluation Plan for the Hazard Helicopter timber sale. More detailed information for each monitoring item is available in the planning records for this sale.

HAZARD HELICOPTER TIMBER SALE MONITORING

PRIORITY	MITIGATION MEASURE	TIMING	METHODOLOGY	RESPONSIBLE*	TYPE OF MONITORING
H	Protection of sensitive plants	Annually, for 5 years after roads are closed	Ocularly estimate the impacts to populations of sensitive plants in the planning area.	Forest Botanist	Effectiveness
H	Fuel management in harvested areas and protection of adequate large down woody material	After harvest is complete and after fuels treatment	1) Estimate fuel reduction needs and complete treatment. 2) Ocularly evaluate down woody material after fuels treatment.	District Fuels Specialist	Effectiveness
H	Protection of fisheries habitat by mitigation	Annually, for 3 years after timber harvest	Project surveillance and photos. Measurements of cobble embed-dedness, free matrix, or surface fines. Repeat H-R inventory 3 years after harvest.	District Fisheries Biologist	Effectiveness
H	Regeneration	1st, 3rd, 5th, years after planting	Complete seedling survival checks using standard R-4 methods.	District Silvicultural Specialist	Effectiveness
H	Proper implementation of BMPs in the project design	Once, before project is implemented	On-the-ground review of harvest unit marking, stream crossings, and road work prior to ground disturbance. Report any concerns to District Ranger.	District Watershed Specialist	Implementation
H	Protection of goshawk nest sites	One year prior to harvest and annually thereafter until harvest is complete	Use tape-recorded goshawk vocalizations in harvest units.	District Wildlife Biologist	Implementation/ Effectiveness
H	Protection of peregrine falcon nest sites	Once prior to harvest and annually thereafter until harvest is complete	Survey of potential nest cliffs in the spring.	District Wildlife Biologist	Implementation/ Effectiveness
H	Protection of wolf habitat	Once, prior to harvest	Using human vocalizations, inventory planning area for wolf use.	District Wildlife Biologist	Implementation
H	Protection of elk habitat	Once, following harvest	Review pre-sale marking to evaluate elk hiding and thermal cover left and to ensure no openings larger than 40 acres.	Wildlife Biologist	Implementation/ Effectiveness

HAZARD HELICOPTER TIMBER SALE MONITORING (Continued)

PRIORITY	MITIGATION MEASURE	TIMING	METHODOLOGY	RESPONSIBLE*	TYPE OF MONITORING
M	Protection of pileated woodpecker habitat	Once, 5 years after harvest	Use circular plots around nest sites to determine characteristics.	District Wildlife Biologist	Effectiveness/ Validation
M	Protection of old growth habitat components	Once, following harvest	Determine acres and distribution of old growth using timber inventory. Review for amount and distribution of pileated woodpecker habitat.	Wildlife Technician	Effectiveness
M	Maintenance and health of uneven-aged stand structure	Once, following harvest	Establish stand exam plots prior to harvest. Sample plots before and after harvest.	District Silvicultural Specialist	Implementation/ Effectiveness
M	Protection of water quality implementation and effectiveness monitoring	Each visit and annually until harvest is complete	Ocularly review during harvest inspections. Complete BMP checklist forms at the end of each operating season.	District Watershed Specialist	Implementation/ Effectiveness
L	Protection of biodiversity	Once, within one year after harvest	Using timber inventory data and observations, determine impacts to plant and animal diversity.	Wildlife Biologist or Ecologist	Effectiveness/ Validation

MONITORING PRIORITY CODES

H = High. Required monitoring. Must occur if the project is implemented.
M = Moderate. Needed monitoring. Should occur if the project is implemented and funding is available.
L = Low. Optional monitoring. May occur if the project is implemented and funding is available.

* The District Ranger is ultimately responsible for the required monitoring. This column indicates the person(s) most likely to conduct the monitoring.

APPENDIX C
GLOSSARY

This glossary gives definitions of technical or specialized terms as they are used in this EIS. The definitions may be more restrictive than in common usage.

A

accelerated erosion
Erosion at a rate greater than normal that is usually associated with human-caused disturbances.

accelerated sediment production
Sediment caused by human activities in addition to that occurring naturally.

acres of stream occupied
The physical stream surface area occupied by fish as determined from stream inventories.

activity fuels
Debris generated from any activity on the Forest, such as timber harvest, that increases fire potential.

advance regeneration
Seedlings and saplings that remain on the site after harvest. If they are a desired species, have good form, and are capable of rapid growth, they can reduce the amount of new regeneration needed.

airshed
The geographic area that, because of topography, meteorology, and climate, shares the same air.

allotment management plan (AMP)
The plan that identifies specific resource objectives for a grazing allotment. Grazing systems are developed and improvements identified in order to meet those objectives.

allowable sale quantity (ASQ)
The amount of timber that may be sold from the suited timber land during a 10-year period.

all-terrain vehicle (ATV)
Straddle-seat trail vehicle with three or four wide wheels.

alternative
One way to conduct a proposed project. A combination of sale variations (one from each timber sale) that follow a certain theme of management. For example, the Wildlife/Timber Emphasis Alternative.

amenities
The aesthetic, non-monetary values people find in natural environments. Examples are clean air, scenery, flora and fauna. Contrast with commodities, such as timber and livestock grazing.

anadromous fish
Fish that spend a portion of their lives in salt water and migrate to fresh water to reproduce. Salmon and steelhead are examples.

animal unit month (AUM)
A unit of measure based on the amount of forage required by an animal unit for one month. (An animal unit is a 1,000 pound cow and calf, or 3 sheep.)

apparent naturalness
Measure of the magnitude and importance of human-caused impacts to the human visitor; natural integrity as perceived by the visitor.

aquatic ecosystem
The stream channel, lake bed, water, and the biotic (plant and animal) communities that occur therein.

arterial road
(see roads)

B

background
The seen area beyond 3 to 5 miles from a viewer's position.

below-cost
Timber sale (or volume) that costs more to prepare, sell and administer than it returns in revenue.

beneficial use
Use of the waters of Idaho, including, but not limited to, domestic, industrial, and agricultural water supplies, navigation, recreation, wildlife habitat, and aesthetics.

best management practices (BMPs)
Practices determined by the Idaho Department of Health and Welfare, Division of Environment, to be the most effective and practicable means of preventing or reducing the amount of pollution generated by non-point sources.

biological corridor
(see corridor)

biological diversity
The variety of life and the processes that sustain it. More specifically, it is the variety, abundance, and distribution of species and the processes through which they interact. It encompasses species diversity, genetic diversity, and ecosystem diversity.

board foot
A measurement of wood equivalent to a board one foot square and one inch thick. Usually expressed in terms of thousand board feet (MBF) or million board feet (MMBF).

BOISED
A predictive computerized model that estimates cumulative sediment production from road construction, fire, and timber harvest activities in forested watersheds.

bole
Trunk of the tree.

broadcast burn
A prescribed fire designed to burn over a designated area within well-defined boundaries to reduce the wildfire hazard and/or as a silvicultural tool to prepare a site for regeneration.

bulk density
The mass of dry soil per unit volume. Bulk density is used as an indirect measurement of compaction.

bull trout
Idaho's only native char, the bull trout (*Salvelinus confluentus*) is commonly known as the dolly varden. The bull trout is a Forest Service designated sensitive species and an Idaho Fish and Game species of Special concern. A petition has been submitted to the Department of Interior to list this species under the Endangered Species Act.

burn plan
A plan prepared by fuels specialists that describes the management objectives of the burn, weather and fuel conditions necessary to burn safely, and the staff and equipment needed to conduct the burn.

C

class I stream
A perennial or intermittent stream that provides domestic water or contains fish in the stream channel, at least seasonally.

class II stream
All perennial and intermittent streams that do not provide domestic water or support fish.

cleaning
An intermediate stand treatment that removes one tree species to favor another in young stands. It regulates species composition early in the development of the regeneration. Often done at the same time as a precommercial thinning.

clearcut
The removal, in a single cut, of all merchantable trees in the harvest unit.

clearcut - reserve tree
A clearcut with designated leave trees for wildlife or other purposes. In addition, advanced regeneration suitable for future crop trees is retained where feasible.

climax (vegetation)
Vegetation that will eventually dominate a site if no significant disturbance occurs over a long period of time. Often climax vegetation is tolerant of shade.

cold water biota
Animal and plant life that grow best in water temperatures below 18 degrees C.

collector road
(see roads)

combined effects
The effects of all the currently proposed sales added together.

commercial thinning (CT)
Removal of excess or non-crop trees in young sawtimber stands to improve health and vigor of the remaining trees. The trees removed can be sold for a variety of products. This intermediate cut may be used in both uneven-aged and even-aged stands.

compaction
A reduction in the volume of a soil generally occurring when stresses are applied to the soil that are sufficient to deform and compress the soil.

contract
Timber sale contract. The binding document between Forest Service and timber purchaser that states how the sale will be logged.

conversion (type or stand)
The conversion of the dominant vegetation in an area from forested to non-forested or from one tree species or age class to another. For example, converting a mature stand to a young stand, or from grand fir to Douglas-fir.

cord
A unit of measurement for stacked firewood four feet high, four feet wide, and eight feet long. Occupying 128 cubic feet of space, a cord of contains about 75 cubic feet of actual wood.

corridor
A defined tract of land, usually linear, that enables species to travel between areas of suitable habitat. It serves several purposes:

- enlarges the habitat base for animals with large home ranges,
- provides for genetic exchange within or between populations,
- provides a route by which populations can move in response to environmental changes,
- allows for dispersal of individuals to maintain a well distributed population.

cumulative effects
The effects of multiple activities that may be separated by time and space. Impacts resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. In this project, cumulative effects include the combined effects of near-term and outyear sales, in addition to activities on adjacent state and private lands.

cut slope
That portion of the slope that is excavated in constructing roads, trails, landings, or skidtrails.

cutting cycle
The planned interval between major harvesting operations in the same stand. A 20-year cutting cycle indicates a harvest done once every 20 years. (Uneven-aged management has cutting cycles, even-aged management has rotation ages.)

D

diameter breast high (DBH)
The diameter of a tree measured 4 1/2 feet above the ground.

diameter class
Grouping of tree sizes to facilitate management. For example, with 2-inch diameter classes, trees 5.0 to 6.9 inches in diameter would go into the 6" diameter class.

decadent (timber stand)
A stand showing slow growth, significant mortality, and declining vigor. Annual mortality generally exceeds annual growth.

deferred rotation
A grazing system that delays grazing in one pasture until after seed production. The pasture that is deferred changes every year.

desired condition
In a project analysis document, the Forestwide desired future condition as applied to a specific project area.

desired future condition (DFC)
In the Forest Plan, a concise but general description by resource of what the Forest should be approximately 50 years in the future. It is the resulting condition of meeting the goals and objectives by following the standards and guidelines of the Forest Plan.

detrimental disturbance
The alteration of the natural soil characteristics that result in significant or prolonged degradation of off-site resources or a reduction in timber volume growth potential or biomass production potential. These disturbances include soil puddling, soil compaction, soil displacement, and severely burned soils. Examples include moderately and heavily used skidtrails, areas where the upper layer of the soil has been moved, areas where heavy equipment has been operated under saturated conditions, and areas where the soil has a reddish color resulting from burning activities.

direct effects
Impacts caused by the action and occurring at the same time and place.

directional felling
Cutting down a tree so that it falls in a desired direction.

discounting
An adjustment for the time value of money, which involves mathematically reducing costs and/or benefits occurring in the future to a common point in time, usually the present, for comparison.

duff
The layer of partially decomposed organic matter just above the soil (and below the litter layer).

dwarf mistletoe
A parasitic plant that grows on many conifer tree species. Each species of dwarf mistletoe is host specific (usually confined to a single host tree species). Dwarf mistletoe reduces tree growth and causes stress that may eventually cause the death of the tree. It is spread from one tree to another adjacent tree of the same species.

E

ecological
Pertaining to the relationships between organisms and their environment.

economic analysis
An analytical method in which incremental market and non-market benefits are compared with incremental economic costs.

economic base
As used in regional economics, the portion of the economy that brings outside monies into the local economy. These monies are generally derived from exports or sales to non-local residents.

economic efficiency
A measure of how well inputs are used to achieve outputs when all inputs and outputs (including environmental) are identified and valued.

ecosystem
All the interacting populations of plants, animals and microorganisms occupying an area, plus their physical environment. Examples of ecosystems are alpine meadows, ponderosa pine forests and prairie grasslands.

ecosystem resiliency
Ability of the ecosystem to recover following disturbances.

edge
The place where plant communities meet or where successional stages or vegetative conditions within plant communities come together.

edge effect
The change in flora, fauna and microclimate occurring where different plant communities or successional stages meet.

edge species
Plants or animals that inhabit or utilize the area where two different habitats or successional stages meet.

EIS
An abbreviation for Environmental Impact Statement.

elk habitat effectiveness (EHE)
A system to evaluate the quality of elk habitat that is based on road density, road impacts, the ratio of forage to cover, and the juxtaposition of forage and cover on the landscape.

elk management unit (EMU)
A division of big-game summer range. EMUs are used to evaluate cumulative effects to elk habitat from several projects in a given area.

embeddedness
The amount of channel material (gravel, rubble, and boulder) that is covered by sand and silt. Substrates of 100 percent sand and silt are considered to be 100 percent embedded.

emphasis
The objectives, activities, or resources that an alternative seeks to achieve, enhance, or maximize. An "emphasis statement" is synonymous with the theme of an alternative.

endangered species
An animal or plant that has been given federal status as a species that is in danger of extinction throughout all or a significant portion of its range.

entry (timber sale)
Entering a forested area by constructing roads and harvesting timber.

ephemeral stream
A stream that carries only surface or runoff water. It flows only during and immediately after precipitation and snow melting.

even-aged management
The combination of treatments that result in the creation of a stand of trees of essentially the same age. Regeneration harvest methods that produce even-aged stands include clearcutting, seedtree cutting, and shelterwood cutting.

excellent (range condition)
The highest category of ecological health of the range; producing vegetation that approaches the natural potential.

extensive timber management
A less intensive level of timber management that involves some harvest and usually relies on natural regeneration. Control of competing vegetation and precommercial thinnings are not usually done. Investment levels are low.

F

fill
Earth or rock moved during road construction and used to build up portions of the roadway.

fill slopes
The sloping earth surface on the downhill side of a road resulting from roadway excavation.

fine fuels
Generally grass, needles, twigs, and small branches under 3 inches in diameter that ignite easily and carry fire rapidly.

Fine sediment
Mineral and organic particles smaller than 6.3 millimeters.

floodplain
Flat area next to water that is subject to a 1 percent or greater chance of flooding in any given year.

fluvial granitic lands
Lands that have been formed from granitic parent material and altered through the erosive force of running water.

forage
Plant material (usually grasses, forbs, and brush) that is available for animal consumption.

foreground
The seen area generally within 1/4 mile of a viewer's position.

forest cover
A generally continuous layer of vegetation consisting mainly of trees of any age.

forest travel map
The Payette National Forest Travel Management Map, as updated annually. Gives access management direction for all parts of the Forest.

fragmentation
The breaking up of continuous blocks of habitat by natural processes or development activities; extensive development can create islands of habitat on a fragmented landscape.

free ecosystem services
Benefits that man receives from the interaction of the living and non-living environment. The benefits can be manipulated to increase its usefulness. For example, bacteria, fungi and protozoans clean water of dead plants and animals. Man has learned to use this and to accelerate the process for sewage treatment.

fuel continuity
Arrangement and extent of fuel. Continuous fuels have no breaks that would stop or slow the spread of fire.

fuels treatment
The rearrangement or disposal of fuels to reduce fire hazard or to accomplish other resource management objectives.

G

gap analysis
A large-scale analysis of vegetation types and vertebrate wildlife species to determine general areas of unique habitat that may need to be managed for their natural values. The University of Idaho has developed and is currently improving Gap Analysis for the state of Idaho.

geographic information system (GIS)
A computer system designed to store, analyze, and display mapped data.

girdling
Removing the bark around the base of a tree in order to kill it. This will leave it standing as a snag.

glaciated cirque basin
The semicircular concave bowl-like areas with steep faces that result from the ice and snow abrasion reduction of peaks.

goal
A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad and general terms, and may not have a specific date for completion. Goal statements form the principal basis from which objectives are developed.

good (range condition)
The second highest of four categories of ecological health of the range; 50 to 75 percent of the natural vegetative growth potential.

grazing permit
A document that authorizes livestock use on National Forest lands, specifying the number of animals and length of time allowed.

group selection
Harvesting all trees in selected small groups (up to two acres in size). An uneven-aged management harvest method that favors shade-tolerant or shade-intolerant tree species, depending upon the size of the group.

growth
As used in this document, it refers to tree or sawtimber production. Efficient sawtimber growth can often be improved by controlling the spacing between the trees, reducing competing vegetation, and controlling damage from insects and disease.

H

habitat
The place where a plant or animal naturally or normally lives or grows.

harvest
Removal of timber (or a portion of an animal population) to achieve a specific future condition. In this EIS, the acres harvested are the actual acres of timber cut.

head crack
The cracks that form at the head or upslope portion of mass movements.

heavy use
Livestock grazing that uses more than an average of 66 percent of desirable forage species.

helicopter (H) logging
A method of logging that uses helicopters to lift and move logs from the woods to a point where they can be loaded onto trucks.

helispot
Any designated landing spot for helicopters. It is distinguished from a heliport by lack of supporting facilities.

herbaceous
Referring to grass and small annual and perennial plants.

high forest cover
The uppermost tree canopy layer.

high risk tree
A tree in a weakened condition, often from insects or disease, which will likely die before the next harvest entry.

holding action
Actions taken to prevent fire from spreading beyond designated boundaries.

horizontal diversity
Changes in vegetation and wildlife habitat on a horizontal plane. In general, a variety of successional stages or vegetative types adjacent to each other is more diverse than large blocks of uniform vegetation.

I

Idaho batholith
A great mass of intruded igneous rock (mostly granite) that covers much of Central Idaho.

immature sawtimber
Trees large enough to be harvested for lumber (usually at least 10 inches in diameter at breast height) but still growing rapidly. Usually these trees are not over their rotation age.

indicator (of an issue)
Element or quantitative measure of an issue that shows how management alternatives address the issue.

indirect effects
Impacts caused by the action but occurring later in time or farther removed in distance.

individual tree selection (single tree selection)
Harvesting individual selected trees. An uneven-aged management harvest method that removes selected trees from a stand. The small openings regenerate naturally over time to maintain the uneven-aged structure. This method favors shade-tolerant species.

inherent erosion hazard
A relative rating of erosional hazard based on the ability of a soil to take in water and to resist detachment under the impact of rainfall and surface water movement, the effect of coarse fragments on reducing surface detachment, and the effect of topography with climate as a constant.

insectivorous
Insect-eating (birds and other animals).

intensive timber management
Applying a variety of actions to increase the production of timber stands. Actions may include planting genetically improved seedlings, precommercial thinnings, commercial thinnings, and/or control of competing vegetation.

interdisciplinary (ID) team
A group of specialists representing two or more areas of knowledge and focusing on the same project. Allows team interaction that leads to integrated resource planning.

interior forest
Older forested areas that are large and dense enough to have an internal core of habitat protected from light, drying conditions and edge species.

interior species
Plants or animals that require dense, forested habitat not close to an ecological edge. Examples are the pileated woodpecker and the hairy woodpecker.

intermediate cut
Cuttings that remove trees from a stand between the time of its formation and the regeneration cut. May be done in both even-aged and uneven-aged management.

intermediate species
Trees adapted to partial sunlight rather than full sun or full shade.

intermittent stream
A stream that carries water most of the year, but ceases to flow during the dry season because of evaporation or percolation into the stream bed.

intolerant (vegetation)
Trees or other vegetation that prefer sunlight to shade (intolerant to shade). These species require open sunlight to regenerate and grow well. Many of the more commercially valuable tree species are intolerant: lodgepole pine, aspen, ponderosa pine, western larch, and to a lesser extent Douglas-fir.

islands
Forest habitat that persists on the land when the adjacent forest has been removed. The creation of islands, through land development is fragmentation.

issue
A point, matter, or question of public discussion or interest to be addressed or decided through the planning process.

K

Knutson-Vandenberg (K-V)
Act of Congress (1930) authorizing the Forest Service to collect funds from timber sale receipts to finance reforestation and improvement of harvested areas.

L

ladder fuels
Grass, brush, and/or lower dead limbs that allow a ground fire to climb into the crowns of trees.

landform
A natural landscape that exists as a result of wind, water, ice, and geologic activity. For example, a mountain, valley, ridge, or basin.

landing
A roadside location where logs are stored or loaded onto logging trucks.

landscape
A large area including many ecosystems. For example, a large watershed or a mountain range.

landtypes
A portion of the landscape resulting from geomorphic and climatic processes with defined characteristics that have predictable soil, hydrologic, engineering, productivity, and other behavior.

large woody debris (material)
Woody material 3 inches in diameter and greater that influences sediment transport and steam morphology. This material provides hiding and security cover for fish and aids in nutrient cycling for soil.

leave tree
A live tree left standing in a harvest unit.

linked
As used in economic analysis, connected by supply-and-demand relationships; for example, a feed supplier is "linked" to a livestock producer, a logger is "linked" to a sawmill.

local road
(see roads)

logging system
The type and sequence of methods used to move timber from standing trees to logs on a truck. Logging system yarding methods include overland tractor (crawler or rubber tired and forwarder), cable system (jammer or high-lead or skyline), aerial (helicopter or balloon), and horse.

lop and scatter
When branches are cut from fallen trees and scattered over the area rather than piled for burning. This allows the slash to lie close to the ground to reduce the fire hazard and speed decomposition.

M

manageability
The degree to which a roadless area can be managed as wilderness in accord with the requirements of the Wilderness Act.

management area
An area of land with similar management goals and a common management prescription, as described in the Forest Plan.

management indicator species
Species whose condition and population changes are used to assess the impacts of management actions on a plant, animal, or fish community in a particular place.

market good
A good (or service) that is bought and sold in a competitive environment (market). For example: timber, livestock forage, campground use.

mass movement
Downward movement of a portion of the land surface; a general term for a variety of processes by which masses of earth materials are moved from one place to another.

mass stability hazards
A relative rating of the susceptibility of a land unit to the process of mass movement.

mature timber
Trees that have attained full development, particularly height, and have peaked in growth.

merchantable (timber)
Meeting standards for minimum size and soundness.

metamorphosed (rock)
Formed into the solid state in response to heat, pressure, and chemical environment.

microsites
The localized conditions of soil, temperature, moisture, exposure, etcetera, in a very small area such as around a tree or plant.

middleground
The seen area generally from 1/4 mile to 3 miles of a viewer's position.

mitigation
Action(s) to avoid, minimize, reduce, eliminate, or rectify the impact of a management activity.

mixed conifer type
Stands composed of a mixture of tree species, primarily ponderosa pine, Douglas-fir, grand fir, and to a lesser extent western larch, subalpine fir, and Engelmann spruce.

monitoring
The evaluation on a sample basis of resources or management practices to determine how well management objectives have been met, as well as the effects of those management practices on the land and environment.

monoculture
A tree plantation of all the same species.

montane
Growing in or inhabiting mountain areas.

MTVEST
An investment analysis computer program that calculates present net value based on specified costs and benefits.

N

National Register of Historic Places
The federal list of areas of historical significance. Includes places of local and state as well as national value.

natural appearance
Measure of the magnitude and importance of human-caused impacts to the human visitor; natural integrity as perceived by the visitor.

natural fuels
Fuels naturally occurring on the site. Includes snags, down trees, dead branches, twigs, leaves, shrubs, and dead grass.

natural integrity
Measure of the extent to which natural processes of an area have been affected by human activity (roads, timber harvest, mines, etcetera).

natural sediment production
Sediment produced by natural erosion processes.

near-term sales
Those proposed timber sales in the first few years of the 10-year planning period for which specific data are available. They are part of the proposed action being analyzed for approval in this EIS. (As opposed to outyear sales.)

negative growth
This condition occurs in stands where mortality and decay are happening faster than tree growth.

NEPA
An abbreviation for the National Environmental Policy Act of 1969, which requires environmental analysis of federal actions.

nonforest land
Land never having or incapable of having greater than 10 percent of the area occupied by forest trees.

non-interchangeable component (NIC)
A part of the Forest's total allowable sale quantity from a specific area or type of stand. This part cannot replace or be replaced by timber from another NIC. The Payette National Forest Plan establishes four NICs:

-Base Program, Conventional Logging Methods
-Base Program, Helicopter Logging
-Whitewoods (mainly lodgepole pine and subalpine fir)
-South Fork Salmon River.

Roadless area timber is also considered in effect a NIC, as it cannot replace or be replaced by timber from the roaded parts of the Forest (Forest Plan, IV-51).

not appropriate (forest land)
Forest land not selected for management under the current Forest Plan.

nonmarket good
A good (or service) that is not normally exchanged in a market at any stage of production before consumption.

noxious weed

An officially designated plant species that causes negative major ecological and economic impacts to both agricultural and National Forest lands.

O

objective
A concise, time-specific statement of measurable planned results responding to pre-established goals. It forms the basis for further planning to define the precise steps to be taken and resources to be used in achieving the goals.

old growth
A forest habitat that has reached the late stages of development. In addition to age, characteristics of old growth include large diameter trees, two or more canopy layers, dead standing and downed trees, and small openings within the stand.

opening (created)
A condition created by harvest systems that result in a residual stand of 15 or less mature or overmature trees per acre and reproduction is less than 4 to 8 feet tall. An opening is eliminated when reproduction reaches an average of 4 to 8 feet in height.

opportunity for primitive recreation
An area's capacity to allow a visitor to engage in forms of recreation that are nature-oriented rather than equipment-oriented. Examples are hiking, backpacking, hunting, fishing, and nature study.

opportunity for solitude
An area's capacity to allow a visitor to experience isolation from signs of civilization.

order 2 soil inventory
A specific level or intensity of soil inventory that classifies soil units according to Soil Taxonomy.

outyear sale
Those sales toward the end of the 10-year planning period for which specific data are not available. (As opposed to near-term sales analyzed in detail in this EIS.)

overmature timber
Trees that have attained full development, particularly in height, and are declining in vigor, health, and soundness.

overstocked
Condition of a stand or forest having more trees than desired. Trees in overstocked stands are slow growing, often weakened by competition for sunlight and moisture, and susceptible to insects and disease attack and mortality.

overstory
The upper canopy or uppermost layer of the forest.

P

parent material
The unconsolidated mass of rock and soil from which a soil profile develops.

patch
An ecosystem or habitat separated from similar ecosystems. The creation of patches, through land development is fragmentation.

permitted use
The amount of livestock grazing designated by the terms of a grazing permit on a National Forest range allotment.

perennial stream
A stream that usually flows yearlong, except during periods of extreme drought. It has well-defined channels and shows signs of washing and scouring.

pile and burn
Natural or activity fuels (slash) that are piled by hand or with a tractor and then burned. Fuels are piled in openings where fire spread can be controlled and heat will not damage surrounding trees.

planning area
The geographic area studied for a proposed timber sale. Normally a larger area than what the resulting timber sale area will eventually encompass.

plantation
A stand of trees resulting from planting or artificially seeding an area.

planting stock
Tree seedlings, grown in a nursery, and ready for planting in the forest.

potential natural community
The biotic (plant and animal) community that would become established if all successional sequences were completed without interferences by humans. (FSH 2209.21)

precommercial thinning (PCT)
Removal of excess or non-crop trees in young stands to improve health and vigor of the remaining trees. The trees removed are too small to be sold as a commercial product. This intermediate cut may be used in both uneven-aged and even-aged stands.

preferred alternative
The alternative identified by the Responsible Official as the one favored for selection and implementation. Under NEPA regulations, there may be one, two or more, or no preferred alternatives in a draft EIS. There must be one in the final EIS.

prescribed burning
The intentional application of fire to wildland fuels under predetermined conditions. This allows the fire to be confined to a specific area while producing the amount of heat and consumption of fuel required to achieve planned objectives; usually slash disposal, site preparation, or wildlife habitat management.

present net value (PNV)
A measurement of economic efficiency that results when discounted costs are subtracted from discounted benefits.

presettlement
The period from the last major climatic change (about 10,000 years ago) until settlement by Europeans (about 1900). Presettlement describes the vegetative conditions and natural processes that plants and animals adapted to prior to significant human influence. Presettlement conditions describe the framework within which the Desired Future Condition may be developed. Often however, the DFC will not attempt to exactly emulate presettlement conditions.

primary contact recreation
Recreation in surface water which is suitable for prolonged contact by humans and where water ingestion is likely to occur. Examples include: swimming, kayaking, and skin diving.

production potential
The capability of the land or water to produce a given resource.

proposed action
The project, activity, or decision that a Federal agency intends to implement or undertake, as defined in NEPA regulations.

project area
The preliminary outline of a proposed timber sale in the planning stages. Sometimes called “planning area" or "sale area."

Q

quad map
Standard U.S. Geological Survey topographic quadrangle map.

R

range condition
The current health of the range relative to what the range is naturally capable of producing.

recreational opportunity spectrum (ROS)
A means of classifying and managing recreation opportunities based on physical setting, social setting, and managerial setting.

recreation visitor day (RVD)
Twelve hours of recreation use in any combination of persons and hours (one person for 12 hours, 3 persons for 4 hours, etcetera).

redband trout
The native or endemic rainbow-like salmonid that inhabits the streams of the area. It is a recognized subspecies (*Onchorynchus mykiss* spp.) in the same genus as rainbow and cutthroat trout and Pacific salmon.

re-entry
A follow-up harvest or stand treatment done to keep the stand healthy and growing well. The time between entries depends on stand conditions.

regeneration
The renewal of a tree crop, whether by natural or artificial (planting) means. May also refer to the young trees themselves, sometimes called reproduction.

regional economy
A geographic area exhibiting some degree of commercial interaction and cohesion.

replacement stands (for old growth)
Stands that are not yet old growth, that have been set aside to replace adjacent old-growth stands that have returned to a successional stage (either from natural processes or human-caused disturbance).

resident fish
Freshwater species of fish that do not migrate to the ocean.

rest rotation
A grazing system that rests one pasture of an allotment a year. The pasture that is rested changes every year.

revegetate
Re-establish plant cover, either naturally or by manually seeding or planting.

riparian area
Area of land that is directly influenced by water. Streamsides, lake borders, or marshes are typical riparian areas.

roads
arterial road - Provides vehicle access to large land areas, and usually connects with other arterial (major) roads or public highways.

collector road - Intermediate links that connect major heavily traveled, multiple-purpose arterial routes with single-resource local roads.

local road - Connects terminal facilities such as log landings and recreation sites with Forest collector roads or public highways. Usually single-purpose roads.

road construction
Building a new road.

road maintenance
Expenditures in the minor restoration and upkeep of a road necessary to retain the road's approved traffic service level.

road maintenance levels
Categories describing the quality of the road and the increasing amount of maintenance needed to maintain a desired condition.

Level 1 - Road normally closed to all vehicle traffic. Erosion control structures maintained as needed.

Level 2 - Road open for limited passage of traffic but not normally suitable for passenger cars. Includes pickup and four-wheel drive roads.

Level 3 - Road open for public traffic including passenger cars, but may not be smooth or comfortable. Local or collector roads.

Level 4 - Road suitable for all types of vehicles, generally smooth to travel, and dust may be controlled. Collector or arterial roads.

Level 5 - Road is smooth and dust free, and the surface is skid-resistant if paved. Usually arterial roads.

road reconstruction
Upgrading an existing road to an improved standard.

rotation age
The age at which an even-aged stand is considered ready for harvesting.

S

sale
Timber sale. National Forest timber sold to a private company and logged under terms of a timber sale contract.

sale area
A geographic area covered by a timber sale.

sale variation
One way of harvesting a specific timber sale.

sanitation/salvage cut
Harvest of dead, dying, defective, and insect- or disease-infested trees.

scarification
Exposing mineral soil for better seed germination.

scoping
The process the Forest Service uses to determine, through public involvement, the range of issues that the planning process should address.

secondary contact recreation
Recreation in waters that are suitable for fishing, boating, wading, and other activities where water ingestion is not probable.

seedtree (ST)
Even-age harvest similar to clearcutting, except that a few of the better trees of the desired species are left scattered over the area to provide seed for natural regeneration. Generally less than ten trees per acre are left for seed. In addition to the desirable seed trees, selected wildlife trees may be left where appropriate and may be of any size or species.

sensitive species
Plant or animal species that are susceptible or vulnerable to activity impacts or habitat alterations. These species are identified by and specific to Forest Service Regions.

sensitivity level (trails)
Rating of how important the scenery is to users of a trail. Level 1 is high, Level 2 is average, Level 3 is low.

seral (species or vegetation)
The transitional phase in the vegetative succession that occurs before the climax or final stage of succession.

Seven Year Action Plan - 1991
The latest annual update of the Forest Plan Activity Schedule for timber.

shade-intolerant
Describes vegetation needing full sunlight to grow well.

shelterwood (SW1, SW2, SW3)
An even-aged system of timber management that removes all the trees in a series of two or more cuts within 30 years. In this EIS the shelterwood regeneration cut will leave at least 15 trees per acre for seed, shelter (shade), visual, or wildlife reasons. An SW1 is a preparatory cut occasionally done to condition the stand for regeneration, an SW2 is the regeneration cut, and an SW3 is the overstory removal cut to remove the shelter once regeneration is established. These cuts could take place over a period of 20 years or more.

silvics
The science of the growth and development of individual trees and of the forest as a biological unit.

silviculture
The science of tending, harvesting, and replacing stands of trees. The application of silvics to management of the forest.

silvicultural prescription (Rx)
The method selected to manage a forest stand. It is the method that is chosen to tend, harvest, and replace the stand, and results in a distinctive stand structure. Silvicultural systems are broken into two broad types—even-aged and uneven-aged. Types of even-aged regeneration prescriptions include: clearcut, seedtree, and shelterwood methods. Uneven-aged prescriptions include individual tree selection, and group selection. Other non-regeneration prescriptions include thinnings and sanitation/salvage cuttings.

site potential
The inherent potential of a stand to grow timber. Tree growth in natural stands is often below the site's potential because of competing vegetation, crowded conditions, age, decay, and mortality.

skidtrail
A route used by loggers to drag logs from stump to landing. There are two main types:

designated skidtrail A skidtrail that is located prior to harvest activities. The majority of heavy equipment use in all operations (including slash disposal activities) is restricted to these trails so that the impacts to the soil resource are concentrated on specified areas. Designated skidtrails are either returned to production (recontoured - if necessary, ripped, waterbarred, seeded, and fertilized) or become permanent skidtrails.

permanent skidtrail A skidtrail that is allowed to remain on the land following the completion of all harvest activities. These skidtrails become part of the transportation system and are considered a total soil resource commitment. Permanent skidtrails are waterbarred, seeded, and fertilized between entries.

skyline (S)
A method of logging using steel rope, tower, and a powered winch to elevate logs from their position in the woods and carry them to a point where they can be loaded on to trucks.

slash
The woody debris left on the ground after timber cutting or as a result of storm, fire, or other damage. It includes unused logs, uprooted stumps, broken or uprooted stems, branches, twigs, leaves, bark, and chips.

slash filter windrow
Woody debris placed along a slope to trap and hold sediment coming off a hill or road above. Used to decrease the overland flow of water and intercept sediment before it reaches a stream.

snag recruitment tree
A live tree suitable to leave standing as a future snag.

social action
Activity or influence exerted to respond to a perceived threat or to pursue interests and goals. Lobbying is an example.

social conflict
The result of social group(s) taking actions to respond to a perceived threat or to pursue interests and goals.

social group
A category of people who cooperate to pursue common interests and goals.

social system
The networks of interactions created by social groups in order to achieve their goals or interests. The political system is an example.

social value
A common standard or belief in what is important, shared by a social group.

special features
Notable attributes such as unique scenery or anadromous fish that supplement the four required attributes for wilderness listed in the Wilderness Act.

species of special concern
An Idaho Department of Fish and Game designation for native species whose population is low and limited in distribution or has suffered significant reductions because of habitat loss.

species richness
The number of species and the relative abundance of individuals within the species.

stand
A group of trees covering a manageable area and sufficiently uniform in composition, age, arrangement, or condition to be distinguishable from adjacent groups.

stand improvement cuts
Harvests prescribed to improve species diversity, remove deformed trees, favor desired species, develop wildlife trees, etcetera.

stay
Administrative delay; an action the Forest takes to voluntarily suspend implementing one of its decisions.

stocking
The number of trees in a stand. Usually expressed as trees per acre or as a relative measure: well stocked, fully stocked, overstocked, or understocked.

stream segment of concern
Segments of streams that the public has expressed significant interest in and a concern for protection and management. The nomination of these streams is a key part of the Idaho Anti-degradation Agreement (State of Idaho Executive Order #88-23).

subwatershed
A delineated portion of a larger watershed used for analysis purposes (see watershed).

succession (natural)
The gradual replacement of one plant community by another as the vegetation changes over time until the climax community is reached.

successional stage
A recognizable condition of a plant community that occurs during its development from bare ground to climax.

suited (forest land)
Forest land designated in the Forest Plan to be managed for timber production on a regulated basis.

suitable range
Those acres accessible to livestock that can be grazed on a sustained yield basis without damage to the resource.

sunscald
Heat damage from the sun shining on tree bark. Localized death of the cambium resulting from sudden exposure to direct sunlight.

sustained yield
The achievement and maintenance in perpetuity (forever) of a high-level annual or regular periodic output of the various renewable resources of the National Forest system without impairment of the productivity of the land.

T

talus
Rock debris at the base of a cliff or a slope.

tension cracks
Cracks in the soil that result from the motion associated with mass movements. These cracks may form on the flanks or at the head of a mass movement.

theme
A concise emphasis statement for an alternative. A summary description of the alternative focusing on what resources it emphasizes. (Also called "theme statement".)

thinning
Removal of excess or non-crop trees to improve health and vigor of the remaining trees. See precommercial thinning or commercial thinning.

threatened species
Animals or plants that have been given Federal status as a species that is likely to be classified as Endangered.

timber sale
An amount of National Forest timber sold to and logged by a private company and logged under terms of a timber sale contract. Often called "sale" for brevity.

timber sale contract
The binding document between Forest Service and timber purchaser that states how the sale will be logged.

timber stand improvement (TSI)
Treatment to improve the quality of a forest stand; includes thinning, cleaning, release, salvaging, and fertilization.

timber type
Stands or groups of stands that have the same or potentially the same general vegetative make up.

timber value
The dollar value assigned to National Forest timber as calculated from actual prices bid for timber. Timber values vary be tree species size of tree quality of wood, etcetera.

tolerant (vegetation)
Trees or other vegetation that prefer shade rather than full sunlight. These species often require shade to regenerate and can survive and grow well in a shaded environment. Tolerant tree species include grand fir, subalpine fir, and, to a lesser extent Engelmann spruce. See also climax vegetation.

total soil resource commitment
A conversion of a productive site to an essentially nonproductive site for a period of 50 years or more. Examples are permanent skidtrails, landings, roads, and recreational trails.

tractor (T)
Any logging method that uses a (rubber-tire or crawler) tractor for moving logs from the stump to a collecting point, whether by dragging or carrying the logs.

transitory range
Land suitable for livestock grazing that is only available temporarily. For example, following a timber harvest, grasses and forbs available until the tree canopy closes.

treated acres
In this EIS, the treated acres equal the acres within a harvest unit boundary. The exception would be uneven-aged management, where only about 30 percent of these acres will actually be cut.

treatment
The techniques or actions applied to achieve a management objective.

tree length skidding
Moving the entire tree, including the top and branches, to the landing where the slash is piled and burned.

U

underburn
A light broadcast burn under an existing forest canopy. A prescribed fire to reduce fuels but not damage existing trees.

understory
Trees below the overstory, or vegetation (trees, brush, and herbaceous plants) growing under the canopy formed by taller trees.

uneven-aged management
A silvicultural system involving manipulation of a stand to simultaneously maintain:

- Continuous high-forest cover,
- Recurring regeneration of desirable species, and

- Orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products (usually 3 or more age classes).

The cutting methods that create and maintain uneven-aged stands are individual tree selection and group selection. In this EIS two uneven-aged prescriptions are used, both incorporating individual tree and group selection:

uneven-aged normal (UN)
Removal of individual trees and small groups of trees up to a maximum of 2-acre openings. Approximately 20 to 30 percent of the volume is removed from the stand in each harvest entry.

uneven-aged accelerated (UA)
Removal of individual trees and small groups of trees up to a maximum of 2-acre openings. The initial harvest removes approximately 30 to 40 percent of the volume to capture pending mortality. This accelerated prescription is used in stands with a significant number of trees that may not live long enough to be harvested in a normal uneven-aged cycle. Once these high-risk trees are replaced with younger, healthy trees, the more normal harvest rates are implemented.

unit (harvest or cutting)
The area of land where harvest will or has taken place. There are usually a number of cutting units designated within a timber sale.

V

vegetation types
A broad classification of an area based on similarities of existing vegetation.

vegetative successional stage
A recognizable condition that occurs in a plant community as it changes in time from bare ground to climax. Examples are seeding/sapling, immature sawtimber, and old growth.

vertical diversity
The variety and number of habitats in a vertical plane. A multi-storied stand with grasses, shrubs, understory trees, and overstory trees is generally more diverse than a single-storied, even-aged stand.

viable populations
A group of individuals, of one species, of sufficient numbers to maintain existence over time despite normal fluctuations in population levels.

viewshed
Large area commonly seen from one or more viewpoints; for example, a river valley or lookout panorama.

visual quality objectives (VQOs)
Categories of acceptable landscape alteration measured by the degree of change from the natural appearing landscape.

Retention - Management activities are not visually evident to the casual observer.

Partial Retention - Management activities remain visually subordinate to the characteristic landscape.

Modification - Management activities may visually dominate the landscape, but must borrow from naturally established form, line, texture, and color so they appear similar to natural occurrences.

W

watershed
A drainage area, confined by topographic features and often forming a basin, which directs the movement of water to a common location.

water table
The depth below which the land is saturated with water. The dividing plane between the zone of saturation and the zone of aeration.

waterbar
A small earth barrier across a road or skidtrail, used to divert water and reduce erosion. Usually designed to allow vehicle passage.

West Central Idaho Highlands
An economic analysis unit composed of six counties south of the Salmon River within the Payette National Forest's zone of influence that rely upon wood-products for some portion of their economic base: Ada, Adams, Boise, Canyon, Gem, Idaho (portion south of Salmon River), Payette, Valley, and Washington Counties.

wildlife habitats
Broad vegetation associations, described by the University of Idaho in Gap Analysis, that are habitat for similar animal species.

wildlife user day (WUD)
Twelve hours of hunting activity in any combination of persons and hours (one person for 12 hours, 3 persons for 4 hours, etcetera.).

windfirm
Trees with deep root systems that are resistant to being blown over. Trees growing in crowded conditions or on wet soils tend to have smaller, shallow root systems. Certain species, including Engelmann spruce have shallow roots, making them susceptible to blowdown.

windthrow
Trees blown down by strong winds.

wolfy trees
Old trees with large branches that serve as security and perching sites for a variety of animals. These trees (over 20" DBH with large branches and often a dead or flat top) provide perching sites for birds and security for mammals such as pine marten and black bear. They also become snags in the future.

Y & Z

yarding
Moving logs from the stump to a deck, road, or landing where they can then be loaded onto logging trucks.

YUM (Yarding Unmerchantable Material)
Limbs, tops, and unmerchantable logs are brought from the harvest unit to the landing for piling and burning.

zone of influence
An economic analysis unit composed of the ten counties that receive the major portion of the timber , range, and recreation benefits from the Payette National Forest: Ada, Adams, Boise, Canyon, Gem, Idaho (portion south of Salmon River), Payette, Valley, and Washington Counties in Idaho, and Malheur County in Oregon.

APPENDIX D
BIBLIOGRAPHY AND REFERENCES

Anderson, Michael H. and Craig Gehrke. 1988. "National Forests, Policies for the Future." *The Wilderness Society*: Volume 1, Water Quality and Timber Management.

Atkinson, E. 1989. "Great Gray Owl (*Strix nebulosa*) Surveys on the Payette National Forest." Nongame and Endangered Wildlife Program. Idaho Department of fish and Game; Boise, Idaho. 22 pages.

Bachman, D., G. Gadwa, and C. Groves. 1990. "A Winter Survey for Wolverines (*Gulo Gulo*) on the Sawtooth and Challis National Forests, Idaho." Nongame and Endangered Wildlife Program. Idaho Department of Fish and Game; Boise, Idaho. 26 pages.

Bailey, Robert G. 1976. *Description of the Ecoregions of the United States*. Ogden, Utah: USDA Forest Service. 79 pages.

Barrett, Stephen W. 1988. "Fire Suppression's Effects on Forest Succession within a Central Idaho Wilderness." In: *Western Journal of Applied Forestry*, Vol. 3, No. 3: 76-80.

Bartos, L. 1989. "A New Look at Low Flows After Logging." *Proceedings of Watershed '89*, Juneau, AK: USDA Forest Service, Alaska Region.

Belt, H. Belt, T. Merrill., and Jay O'Laughlin. 1992. "Design of Forest Riparian Buffer Strips for the Protection of Water Quality: Analysis of Scientific Literature." Idaho Forest, Wildlife and Range Policy Analysis Group. Report No. 8. 39 pages.

Berris, Steven N. and R. Dennis Harr. 1987. "Comparative Snow Accumulation and Melt During Rainfall in Forested and Clearcut Plots in Western Cascades of Oregon." *Water Resources Research*, Vol. 23, No. 1, (January): 135-142.

Bigley, R.E. and J.A. Henderson. 1989. "Effects of Slash Burning on Plant Succession and Timber Stand Establishment." *The Burning Decision: Regional Perspectives on Slash*. University of Washington, Seattle: 47-68.

Boyer, Donald E. and John D. Dell. 1980. *Fire Effects on Pacific Northwest Forest Soils*. USDA Forest Service, Portland, Oregon. 59 pages.

Bull, E.L., S.R. Peterson, and J.W. Thomas. 1986. "Resource Partitioning Among Woodpeckers in Northeastern Oregon." USDA Forest Service, Research Note PNW-444.

Bull, E.L., M.G. Henjum, and R.S. Rohweder. 1988. "Nesting and Foraging Habitat of Great Gray Owls." *Journal of Raptor Research*, 22: 107-115.

Burns, Russell M. 1983. "The Silvicultural Systems for the Major Forest Types of the United States." *Agricultural Handbook No. 445* (December). USDA Forest Service, Washington DC. 191 pages.

Burns, Russell M. 1989. "The Scientific Basis for Silvicultural and Management Decisions in the National Forest System." *General Technical Report WO-55* (September). USDA Forest Service, Washington DC.

Carlson, Lassey, and Lassey. 1981. Referenced on page III-67 of the Final Environmental Impact Statement for Valbois, the Resort at Cascade Lake, Idaho, Valley County. USDA Forest Service 1989.

Chapman D.W. and K.P. Mcleod. 1987. *Development of Criteria for Fine Sediment in the Northern Rockies Ecoregion*. Final report work assignment 2-73, Battelle Columbus Laboratories. EPA Contract No. 68-01-6986. 279 pages.

Christensen, Norman L., et al. 1989. "Ecological Consequences of the 1988 Fires in the Greater Yellowstone Area." Final Report, The Greater Yellowstone Postfire Ecological Assessment Workshop. 58 pages.

Christner, J. and R. Dennis Harr. 1982. "Peak Streamflows from the Transient Snow Zone, Western Cascades, Oregon." Western Snow Conference, Reno, NV, April 20.

Clayton, James L. 1981. "Soil Disturbance Caused by Clearcutting and Helicopter Yarding in the Idaho Batholith." USDA Research Note INT-305. Ogden, Utah. 7 pages.

Cleaves, Dave. "Economics of Uneven-aged Stand Management." Oregon State University, Corvallis, OR. 15 pages.

Cooper, Robert W. 1973. "The Tradeoffs Between Smoke from Wild and Prescribed Forest Fires." Proceedings from Air Quality and Smoke from Urban and Forest Fires, National Academy of Sciences. Fort Collins, CO: October 24-26. Pages 19-26.

Conservation Data Center (CDC). 1992. Idaho CDC Database Printout. Nongame and Endangered Wildlife Program. Idaho Department of Fish and Game; Boise, Idaho.

Cottingham, Robert. 1989. "Optimality of Clearcutting." Unpublished paper presented at the Ninth Intermountain Region Silvicultural Workshop. Ogden, Utah. 1 page.

Crocker-Bedford, D.C. 1990. "Goshawk Reproduction and Forest Management." *Wildlife Society Bulletin*, 18: 262-269.

Daniel, T., J.A. Helms, and F.S. Baker. 1979. *Principles of Silviculture*. New York: McGraw Hill.

Deeming, John E. 1990. "Effects of Prescribed Fire on Wildfire Occurrence and Severity." *Proceedings of Natural and Prescribed Fire in Pacific Northwest Forests*. Corvallis: Oregon State University Press (95-104).

Demetriodes, T. 1993. Unpublished data, Forest strata database. USDA Forest Service. Payette NF. McCall, Idaho.

Department of Commerce, NOAA. 1991. "Threatened Status for Snake River Spring/Summer Chinook Salmon, Threatened Status for Snake River Fall Chinook Salmon." *Federal Register*: Volume 57, Number 58.

Erman, Don C., et al. 1977. "Evaluation of Streamside Buffer Strips for Protecting Aquatic Organisms." California Water Resources Center Technical Completion Report. Contribution No. 165.

Emmingham, Bill. "Introduction to Uneven-aged Management: Concepts and Terminology." Oregon State University, Corvallis, OR. 5 pages.

Everest, Fred H., et al. 1986. "Fine Sediment and Salmonid Production: A Paradox." In: Streamside Management: Forestry and Fishery Interactions: Proceedings of a symposium; February 12-14, 1986; Seattle, WA: University of Washington, College of Forestry Resources, Institute of Forest Resources: pages 98-142.

Fitzgerald, Stephen. "A Conceptual Approach to Tree Marking in Uneven-aged Stands." Oregon State University, Corvallis, OR. 5 pages.

Franklin, Jerry F. 1976. "Effects of Uneven-aged Management on Species Composition." In: Uneven-aged Silviculture and Management in the United States, General Technical Report, WO-24: pages 169-175.

Gibbs, Carter B. 1976. "Even-aged Silviculture and Management? Definitions and Differences." In: Uneven-aged Silviculture and Management in the United States, General Technical Report, WO-24: pages 18-24.

Gordon, Donald T. 1976. "Regeneration." In: Uneven-aged Silviculture and Management in the United States, General Technical Report, WO-24: pages 159-168.

Graham, Russell T. 1987. "Uneven-aged Management in Northern Rocky Mountains." In: Proceedings of the National Silviculture Workshop, Silviculture for All Resources, Sacramento, CA.; May 11-14, 1987. Pages 290-297.

Graham, Russell T. 1989. "Uneven-aged Management: Concerns and Biological Realities." Unpublished paper presented at Petersburg, Alaska. USDA Forest Service, Intermountain Research Station, Moscow, Idaho. July 10-14, 1989. 22 pages.

Graham, Russell T. 1990. "Sustaining Soil Productivity of Forest Soils in the Inland Northwest." In: Proceedings of Soil Productivity Workshop, Payette National Forest, July 17, 1990. 4 pages.

Graham, R.T., Harvey, A.E., Jurgensen, M.F., Page-Dumroese, D.S., Tonn, J.R., Jain, T.B., and Geiger-Hayes, K. 1991. "Sustaining Soil Productivity of Forest Soils in the Inland Northwest." 42 pages.

Hagle, S.K. and D.J. Goheen. 1988. "Root Disease Response to Stand Culture." In: *Proceedings of the Future Forests of the Intermountain West: a Stand Culture Symposium.* USDA Forest Service General Technical Report INT-243, pages 303-309. Intermountain Forest Research Station; Ogden, Utah.

Hall, Dale O. 1976. "Benefits and Costs of Uneven-aged Regulation." In: Uneven-aged Silviculture and Management in the United States, General Technical Report, WO-24: pages 202-216.

Hamilton, Ron. 1990. "Single-Tree Selection Method, an Uneven-aged Silviculture System." Unpublished paper presented at the National Forest Tree Improvement Genetics/Silviculture Workshop; September 1990. 43 pages.

Harr, R.D. and F.M. McCorison. 1979. "Initial Effects of Clearcut Logging on Size and Timing of Peak Flows in a Small Watershed in Western Oregon." *Water Resources Research*, Vol. 15, No. 1, pages 90-94.

Haupt, Harold F. 1972. "The Release of Water from Forest Snowpacks During Winter." USDA Forest Service Research Paper INT-114; January 1972.

Hayward, G. and P. Hayward. 1993. "Boreal Owl Biology and Ecology: Review." Unpublished report prepared for Payette National Forest. Available at Payette NF Supervisor's Office. 47 pages.

Hendrickson, O.Q. 1990. "How Does Forestry Influence Atmospheric Carbon?" In: *The Forestry Chronicle*, October 1990. Pages 469-472.

Hibbert, Alden R. 1967. "Forest Treatment Effects on Water Yield." In: *International Symposium on Forest Hydrology Proceedings.* William Sopper and Howard Lull, eds. Penn. State Univ., Aug 29 to Sept. 10, 1965. Pergamon Press, New York. Pages 527-543.

Hoover, Marvin D. and Charles F. Leaf. 1967. "Process and Significance of Interception in Colorado Subalpine Forest." Pages 213-224. In: W.E. Sopper and H.W. Lull, eds. *Forest Hydrology* (International Sym. Forest Hydrology, University Park, PA. Aug.-Sept. 1967). New York, NY: Pergamon Press. 813 pages.

Horton, William D. 1983. "Instream Flow Investigations." BLM contract No.. YA-553-CTO-1080.

Howe, George E. 1989. "Genetic Effects of Even-aged and Uneven-aged Silviculture." Presented at the National Silviculture Workshop, Petersburg, AK, July 1989. 9 pages.

Idaho Department of Fish and Game, USDI Bureau of Land Management and USDA Forest Service. 1983. "Elk-Timber Relationships of West-Central Idaho." Revised May 1983. 42 pages.

Idaho Department of Fish and Game, 1991. *1991-1996 Draft Anadromous Fisheries Management Plan.* 292 pages.

Johnson, Craig. 1987. Little Salmon River Steelhead Trout Survey. Internal Report. Bureau of Land Management. Cottonwood, Idaho.

Johnson, Leonard R. "Logging Methods for Uneven-aged Management." Unpublished paper, University of Idaho, Moscow, ID. 2 pages.

Johnson, Steven R. 1989. "Snowmelt and Runoff on the Kootenai National Forest." Unpublished report.

Jones, J.L. 1991. "Habitat Use of Fisher in North-Central Idaho." Masters of Science Thesis. College of Graduate Studies. University of Idaho; Moscow, ID.

Jurgenson, M.F.; Larson, M.J. and Harvey, A.E. 1979. "Forest Soil Biology - Timber Harvesting Relationships: A Perspective." USDA Forest Service General Technical Report INT-69. Ogden, UT. 12 pages.

Keane, Robert E., Stephen F. Arno, and James K. Brown. 1990. "Simulating Cumulative Fire Effects in Ponderosa Pine/ Douglas-fir Forests." In: *Ecology*, Vol. 71, No. 1, February 1990. Pages 189-203.

Kilgore, Bruce M. and George A. Curtis, 1987. "Guide to Understory Burning in Ponderosa Pine - Larch-Fir Forests in the Intermountain West." General Technical Report INT-233, September 1987. 39 pages.

Kusel, Jonathan Paul. 1991. "It's Just Like Baseball: A Study of Forest Community Well-Being." PhD Dissertation, University of California, Berkeley. September, 1991. 221 pages.

Laverty, Kent J. 1990. "The Greening of Idaho's Economy." Idaho Conservation League; Boise, Idaho. May 1990. 56 pages.

Lehmkuhl, J.F., L.F. Ruggiero, and P.A. Hall. 1991. "Landscape-Scale Patterns of Forest Fragmentation and Wildlife Richness and Abundance in the Southern Washington Cascade Range." USDA Forest Service, Pacific NW Research Station General Technical Report. PNW-GTR-285. 533 pages.

Levere, W.P., T.L. Raettig, and A.W. Green. 1987. "A Report on Idaho's Timber Supply." USDA Forest Service.

Levine, E., J. Johnston, E. Atkinson, and M. Parker. 1991. "Idaho Peregrine Falcon Survey, Nest Monitoring and Release Program - 1991." Nongame and Endangered Wildlife Program. Idaho Department of Fish and Game; Boise, Idaho. 38 pages.

Lilieholm, R.J., et al. 1990. "Effects of Single Tree Selection Harvests on Stand Structure, Species Composition, and Understory Tree Growth in a Sierra Mixed Conifer Forest." In: *Western Journal of Applied Forestry*, Vol.5, No.2; April 1990. Pages 43-47.

Little, Elbert L. 1978. *Important Forest Trees of the United States*. Agriculture Handbook No. 519, USDA Forest Service, Washington DC, June 1978.

Long, James N. and Theodore W. Daniel. 1990. "Assessment of Growing Stock in Uneven-aged Stands." In: *Western Journal of Applied Forestry*, Vol.5, No.3; July 1990. 3 pages.

Lonner, Terry N. and J.D. Cada. 1982. "Some Effects of Forest Management on Elk Hunting Opportunity." In: Proceedings of the Western States Elk Workshop, Feb. 22-24, 1984. Flagstaff, AZ. Pages 119-128.

Lyle, Corinne R. 1990. "Valley County Gem Community Attitude Exercises." A narrative report to the community. University of Idaho, Moscow, Idaho. March 1990. 6 pages.

Lynch, James A., et al. 1985. "Best Management Practices for Controlling Nonpoint-Source Pollution on Forested Watersheds." *Journal of Soil and Water Conservation*, January-February. Pages 164-167.

Marcus, M.D. et al. 1990. *Salmonid-Habitat Relationships in the Western United States: A Review and Indexed Bibliography*. 84 pages.

Marquis, David A. 1976. "Application of Uneven-aged Silviculture on Public and Private Lands." In: Uneven-aged Silviculture and Management in the United States, General Technical Report, WO-24: p. 25-61.

McLaughlin, William J., et al. 1989. "1987-1988 Rifle Elk Hunting Study." Prepared by the University of Idaho, for the Idaho Department of Fish and Game. Contribution number 499. Idaho Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow, Idaho. October 1989.

Megahan, W.F. and W.J. Kidd. 1972. "Effect of Logging Roads on Sediment Production Rates in the Idaho Batholith." USDA Forest Service Research Paper INT-123.

Megahan, Walter F. 1976. "Effects of Forest Cultural Treatments Upon Streamflow." In: Forest Acts Dilemma Symposium Proc. 1975. Univ. of Montana, Missoula, Montana.

Megahan and Sweithelm. 1983. "Guidelines for Reducing Negative Impacts of Logging." In: Hamilton, Lawrence, and King. *Tropical Watersheds: Hydorologic and Soils Response to Major Uses or Conversions.* Boulder, CO: Westview Press.

Mitchell, Russel G. 1990. "Effects of Prescribed Fire on Insect Pests." In: Proceedings of Natural and Prescribed Fire in Pacific Northwest Forests. Oregon State University Press. Pages 111-121.

Moore, T.L. and G.P. Frederick. 1991. "Distribution and Habitat of Flammulated Owls (*Otus flammeolus*) in West-Central Idaho. Idaho Department of Fish and Game; Boise, Idaho. 28 pages.

Nehlsen, W., et al. 1990. "Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho, and Washington." *Fisheries*: 16(2); 4-21.

Nesbitt, John R. 1991. "Fuels Management in Uneven-aged Management and New Perspective Systems. " In: *New Perspectives Newsletter*, Region 6, March 1991, No. 4. Pages 7-10.

Nussbaum, R.A., E.D. Brodie Jr.,and R.M. Strom. 1983. "Amphibian and Reptiles of the Pacific Northwest." University of Idaho Press. Moscow, Idaho.

Odum, E.P. 1992. "Great Ideas in Ecology for the 1990's." *Bioscience* 42 (7): 542-545.

Payette National Forest. 1988. Land and Resource Management Plan.

Payette National Forest. 1988. Final Environmental Impact Statement.

Powell, David C. 1987. "How to Prepare a Silvicultural Prescription for Uneven-aged Management." USDA Forest Service, Pike and San Isabel National Forests, Pueblo, CO. September 1987. 53 pages.

Randall, Alan; J. P. Hoehn, and C. S. Swanson. 1990. "Estimating the Recreational, Visual, Habitat, and Quality of Life Benefits of Tongass National Forest." General Technical Report RM-192, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. June 1990. 14 pages.

Reid, Will. 1989. "A Survey of 1987 Idaho Anglers Opinions and Preferences." Job completion report F-35-R-13, submitted to the US Fish and Wildlife Service under Federal Aid in Fish Restoration Program. July 17, 1989. 76 pages.

Reinig, L. R.L. Beveridge., J.P. Potyondy. 1991. *BOISED User's Guide and Program Documentation.* USDA, Boise National Forest.

Reiser, D.W. and Bjornn, T.C.; 1979. Habitat Requirements of Anadromous Salmonids, USDA, Forest Service, PNW Forest and Range Experimental. Station. Tech Rep. PHNW-96.

Rieman, B.B. and K.A. Apperson. 1989. "Status and Analysis of Salmonid Fisheries: Westslope Cutthroat Trout Synopsis and Analysis of Fishery Information." Job Completion Report, Project F-73-R-11, Subproject II, Job I, Idaho Department of Fish and Game, Boise, ID. 113 pages (plus Appendix A).

Ripple, W.J., G.A. Bradshaw, and T.A. Spies. 1991. "Measuring Forest Landscape Patterns in the Cascade Range of Oregon." *Biological Conservation* 57: 73-88.

Robinson, G.R., R.D. Holt, M.S. Gaines, S.P. Hamburg, M.L. Johnson, H.S. Fitch, and E.A. Martinko. 1992. "Diverse and Contrasting Effects of Habitat Fragmentation." *Science* 257: 524-526.

Robison, M.H., D.T. Hormaechea, and D.C. Burns. 1987. "Potential Employment Impacts of Anadromous Fish Habitat Management on the Payette National Forest." Payette National Forest, McCall, Idaho.

Robison, M. H., D.T. Hormaechea, and S. Katzer. 1989. "The Impact of a Timber Shortage on the Economy of the West Central Idaho Highlands." University of Idaho; Moscow, ID.

Salazar, D.J., C.H. Schallau, and R.G. Lee. 1986. "The Growing Importance of Retirement Income in Timber-Dependent Areas," U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Research Paper PNW-359.

Sandberg, David V. 1988. "Emission Reduction For Prescribed Forest Burning." APCA/EPA International Specialty Conference; San Francisco, CA. February 22-25, 1988. Pages 628-645.

Sandberg, David V. and Frank N. Dost. 1990. "Effects of Prescribed Fire on Air Quality and Human Health." In: *Proceedings of Natural and Prescribed Fire in Pacific Northwest Forests.* Corvallis, OR: Oregon State University Press. Pages 191-218.

Schmidt, Wyman C. and Milo Larson, 1989. "Silviculture of Western Inland Conifers." In: The Scientific Basis for Silvicultural and Management Decisions in the National Forest System; General Technical Report WO-55, September 1989. Pages 40-58.

Schmidt, J.M. and S.A. Mata. 1992. "Stand Density and Mountain Pine Beetle-Caused Tree Mortality in Ponderosa Pine Stands. USDA Forest Service Research Note RM-515. Rocky Mountain Forest and Range Experimental Station. Fort Collins, Colorado. 4 pages.

Schowalter, T.D. 1991. "Roles of Insects and Diseases in Sustaining Forests." In: Proceedings of the 1991 Society of American Foresters National Convention. August, H-7, *Society of American Foresters*. Bethesda, Maryland. Pages 262-267.

Schwartz, Charles F., Edward C. Thor, and Gary H. Elsner. 1976. "Wildland Planning Glossary." USDA Forest Service General Technical Report PSW-13. Pacific Southwest Forest and Range Experiment Station, Berkeley, California. 252 pages.

Schweitzer, Dennis. 1988. "The Influence of Recreation Values on National Forest Plans." Proceedings of Southeastern Recreation Research Conference, Vol. 10, held in Asheville, NC, February 17-19, 1988. 6 pages.

Simpson, J. and R. Wallace. 1978. *Fishes of Idaho. A Northwest Naturalist Book.* Moscow ID: The University of Idaho Press.

Smith, David Martyn. 1962. *The Practice of Silviculture.* New York, NY: John Wiley and Sons, Inc. 578 pages.

Spahr, R., L. Armstrong, D. Atwood, and M. Rath. 1991. "Threatened, Endangered, and Sensitive Species of the Intermountain Region." Fisheries and Wildlife Management Department, Region 4. USDA Forest Service; Ogden, UT.

Spies, T.A. 1991. "Plant Species Diversity and Occurrence in Young, Mature, and Old Growth Douglas-fir Stands in Western Oregon and Washington." USDA Forest Service. Pacific Northwest Research Station General Technical Report, PNW-GTR-285. Portland, Oregon. 533 pages.

Spurr, Stephen H. and Burton V. Barnes. 1980. *Forest Ecology.* New York, NY: The Ronald Press Company. 571 pages.

Steels, R., R.D. Pfister, R.A. Ryker, and J.A. Kittams. 1981. "Forest Habitat Types of Central Idaho." USDA Forest Service, Intermountain Forest and Range Experiment Station, GTR-INT-114. Ogden, UT. 138 pages.

Stephens, Daniel A. and Shirley Horning Sturts. 1991. *Idaho Bird Distribution.* Idaho Museum of Natural History, Idaho State University, Pocatello, Idaho. Special Publication No. 11. 76 pages.

Stolzenburg, W. 1991. "The Fragment Connection." *Nature Conservancy*, July/August, 1991: 19-25.

Sullivan, Kathleen et al. 1986. "Stream Channels: The Link Between Forests and Fishes." In: Streamside Management: Forestry and Fishery Interactions: Proceedings of a symposium; February 12-14, 1986; Seattle, WA: University of Washington, College of Forestry Resources, Institute of Forest Resources: 98-142.

Swanson, F.J. and J.F. Franklin. 1992. "New Forestry Principles from Ecosystem Analysis of Pacific Northwest Forests." *Ecological Applications* 2 (3): 262-274.

Swanson, R. H. and G.R Hillman. 1977. "Predicted Increased Water Yield After Clear-cutting Verified in West-Central Alberta." Information Report NOR-X-198, Northern Forest Research Centre, Edmonton, Canada.

Thomas, J.W., ed. 1979. "Wildlife Habitats in Managed Forests—The Blue Mountains of Oregon and Washington." USDA Forest Service, Agricultural Handboook No. 553. 512 pages.

Thier, Ralph. 1990. Personal communication with entomologist at Boise Field Station, USDA Forest Service. Boise, Idaho.

Troendle, Charles. 1989. "The Potential Effect of Partial Cutting and Thinning on the Water Balance of the Subalpine Forest." USDA Forest Service, Research Paper RM-274. Fort Collins, Colorado.

Troendle, Charles A. and Charles F. Leaf. 1981. "Effects of Timber Harvest in the Snow Zone on Volume and Timing of Water Yield." In: Interior West. Watershed Mgt. Sym. Proc., Wash. State Univ., Pullman, Washington. 1981.

Tynon, Joanne F., et al. 1989. "The 1987 Idaho Leisure Travel and Recreation Study: Analysis for Region III." Department of Wildland Recreation Management, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, Idaho. February 1989. 35 pages.

USDA Forest Service. 1973. "National Forest Landscape Management, Volume 1." *Agriculture Handbook 434*, Washington DC, February 1973. 77 pages.

USDA Forest Service. 1973. "Soil - Hydrologic Reconnaissance." New Meadows Ranger District, Payette National Forest. Site-specific landtype classification and soil analysis; March 1973. 241 pages.

USDA Forest Service. 1974. National Forest Landscape Management, Volume 2, Chapter 1, "The Visual Management System." *Agriculture Handbook 462*, Washington DC. April 1974.

USDA Forest Service. 1974. *Forest Hydrology: Hydrologic Effects of Vegetative Manipulation, Part II.* 223 pages.

USDA Forest Service. 1976. "Uneven-aged Silviculture and Management in the Western United States." Proceedings of an In-Service Workshop, Redding, CA. October 19-21, 1976. 137 pages.

USDA Forest Service. 1977. *Western Forest Insects.* Miscellaneous Publication No. 1339, Washington DC, November 1977. 654 pages.

USDA Forest Service. 1978. "Uneven-aged Silviculture and Management in the United States." General Technical Report WO-24. Combined proceedings of two in-service workshops held in Morgantown, West VA, July 15-17, 1975, and in Redding, CA, October 19-21, 1976. Washington DC. 234 pages.

USDA Forest Service. 1978. Proceedings of the Symposium on Dwarf Mistletoe Control Through Forest Management. General Technical Report PSW-31; Berkeley, CA, April 11-13, 1978. 190 pages.

USDA Forest Service. 1979. "The Shelterwood Regeneration Method." Proceedings of the National Silviculture Workshop. Charleston, South Carolina; September 17-21, 1979. 281 pages.

USDA Forest Service. 1980. National Forest Landscape Management, Volume 2, Chapter 5, Timber. *Agriculture Handbook 559*, Washington DC. 223 pages.

USDA Forest Service. 1981. "Effects of Fire on Flora." A State-of-Knowledge Review, National Fire Effects Workshop, Denver, Colorado. April 10-14, 1978. General Technical Report WO-16. March 1981. 71 pages.

USDA Forest Service. 1981. Standards and Guidelines for Soil and Related Resources. Unpublished Report. McCall, Idaho.

USDA Forest Service. 1982. *ROS User's Guide.* Chapter 10, Concepts and Chapter 20, Supply. Washington DC. August 1982. 38 pages.

USDA Forest Service. 1983. Silvicultural Systems for the Major Forest Types of the United States. *Agriculture Handbook No. 445.* 191 pages.

USDA Forest Service. 1984. Regional Guide for the Intermountain Region. Forest Planning Guide for the Forests in the Intermountain Region; January 1984.

USDA Forest Service. 1986. *Southwestern Region, Terrestrial Ecosystem Survey Handbook.* Selected pages.

USDA Forest Service. 1988. Proceedings - Future Forests of the Mountain West: A Stand Culture Symposium. General Technical Report INT-243. April 1988. Missoula, MT; September 29 - October 3, 1986. 402 pages.

USDA Forest Service. 1989. "Forest Health Through Silviculture and Integrated Pest Management, A Strategic Plan." 26 pages.

USDA Forest Service. 1989. Payette National Forest Range Management Action Plan, 1990-2000. Unpublished report. McCall, Idaho.

USDA Forest Service. 1990. "The Forest Service Program for Forest and Rangeland Resources: A Long-Term Strategic Plan." Recommended 1990 RPA Program. Washington DC. May 1990. 127 pages.

USDA Forest Service. 1990. *Trail Creek Final Environmental Impact Statement.* USDA Forest Service, Beaverhead National Forest. Dillon, Montana.

USDA Forest Service. 1991. *Bender-Retie Final Environmental Impact Statement.* USDA Forest Service, Beaverhead National Forest. Dillon, Montana.

USDA Forest Service. 1991. "Regions 1, 4, 6. Columbia River Basin Anadromous Fish Habitat Management Policy and Implementation Guide." 30 pages.

USDA Forest Service. 1992. "Management Recommendations for the Northern Goshawk in the Southwestern United States." Rocky Mountain Forest and Range Experimental Station General Technical Report RM-217. Fort Collins, Colorado. 90 pages.

USDA Soil Conservation Service. 1975. "Soil Taxonomy. A Basic System of Soil Classification for Making and Interpreting Soil Surveys." *Agricultural Handbook 436.* Washington DC. 754 pages.

USDI Fish and Wildlife Service. 1987. *Northern Rocky Mountain Wolf Recovery Plan.* Denver, Colorado. 119 pages.

Wallace, Richard L. 1990. "Final Report on the Identity of Cutthroat Trout *Onchorynchus clarki* From Two Locations in the Little Salmon River Drainage in North Central Idaho." Personal Services Contract Report with the U.S. Forest Service, Payette National Forest, New Meadows Ranger District.

Walstad, John D. and Peter J. Kuch. 1987. *Forest Vegetation Management for Conifer Production.* New York, NY: John Wiley and Sons, Inc. 523 pages.

Weatherby. J.C., K.A. Knapp, and B.R. Gardner. 1991. "A Biological Evaluation on the Douglas-Fir Tussock Moth Outbreak in Southern Idaho, 1990." Report R-4-91-04, USDA Forest Service, Intermountain Region. Ogden, UT. 9 pages.

Wickman, Boyd E. "Issues in Application of Uneven-aged Management, Part II. Insects and Uneven-aged Management." USFS PNW Station, LaGrande, OR. 2 pages.

Wilm, H. G. and E. G. Dunford. 1948. "Effect of Timber Cutting on Water Available for Streamflow from a Lodgepole Pine Forest." USDA Technical Bulletin 968, Washington D.C. 43 pages.

Yensen, E., M.P. Luscher, and S. Boyden. 1991. "Structure of Burrows Used by the Idaho Ground Squirrel, *Spermophilus brunneus*." *Northwest Science*, 65: 93-100.

APPENDIX E
RECREATION ANALYSIS

This appendix describes the methodology used to conduct the recreation-related analyses of effects summarized in Chapter 3. The three recreation-related analyses are:

1. Recreation Analysis
2. Visual Quality Analysis
3. MTVEST Analysis

RECREATION ANALYSIS

Recreation Opportunity Spectrum

The Recreation Opportunity Spectrum (ROS) is a system for classifying and managing recreation opportunities based on physical setting, social setting, and managerial setting (see the Forest Plan, pages IV-16 to IV-20, and the ROS User's Guide, USDA Forest Service 1982).

The Forest Planning process inventoried the Forest and identified a ROS class that each part of the Forest then met (inventoried ROS). The Forest Plan then assigned ROS classes to all areas of the Forest (management ROS), reflecting multiple use objectives, such as proposed timber sales, and the resulting desired future condition. ROS maps are on file at the Forest Supervisor's office, McCall. Figure R-1 in the Recreation section of Chapter 3 illustrates the inventoried and managed ROS classes in the sale planning area.

The ROS maps were used to project analysis to determine changes in recreation opportunity resulting from each alternative. An overlay of each alternative map was placed over the corresponding inventoried ROS map for the area. A broad outline was drawn around the area affected by roads and harvest units. This potentially affected area was measured, and the acreage was subtracted from the inventoried ROS class of semi-primitive and assigned to the roaded modified class to show the change by alternative. Chapter 3 describes the results.

The system defines six classes of recreation opportunities, as determined by types of activities available, settings, and experiences. The three classes available in the six planning areas are semi-primitive motorized, roaded natural, and roaded modified.

Semi-Primitive Motorized - Natural appearing landscapes are emphasized. Evidence of human use does not draw the attention of motorized users. Interaction among users is low to moderate. Roads are absent, but motorized vehicles such as motorbikes and ATVs may be present on trails.

Roaded Natural - Resources may be modified but modifications harmonize with nature. User interaction may be moderate. These areas provide settings where users can test and improve their outdoor skills with low risk. Areas along main Forest roads often fall in this category.

Roaded Modified - Resources may be substantially modified, and modifications may not fully harmonize with nature. User interaction may be moderate to high. These areas provide altered settings where users can test their outdoor skills away from more used areas and where recreation is not the main objective. Roaded areas away from main Forest roads often fit this category.

Recreation Visitor Days

Recreation visitor days (RVDs) are the main measure of recreation use of National Forests. RVDs for each alternative were predicted by using a spreadsheet computer program that estimated RVDs by year and by alternative. RVDs are a

function of timber sale activities in the different alternatives. These RVD values were used as input in the MTVEST economic model and as the basis for calculation changes in recreation use by alternative in the Chapter # effects charts.

Current year recreation (1991) was estimated from the data in the Recreation Information Management (RIM) reports for the general area, collected by the Ranger Districts and compiled at the Supervisor's Office. Current Year RVDs were tempered by personal knowledge and professional judgment, which interpolated data down to the specific planning area level.

For future years, the model predicted RVDs in terms of changes from present, and changes from that projected for no action for each year. For the no action situation, the model assumed that recreation use would increase at a constant three percent a year--the same as the area's population growth rate. This is consistent with the Forest Plan's recreation growth projection for the Forest at large.

For alternatives that build roads and conduct timber sales, the model assumed a recreation increase of three percent per year until the timber sale. Then several variables come into play. Factors that affect future recreation use are many. In this analysis, they include: current popularity of the area, current types of use, road miles built and their locations, road closures, duration of sale, harvest unit size, locations, total acreage visually affected, and effects on trails. The total change is a subjective interpretation of all these factors.

The model accepted three resulting variables for change in RVDs that varied by alternative:

a = the **percent decline** upon the start of the timber sale,
b = the **percent recovery** after sale activities (percent of what it would have been for the same year, under no action); and
c = the **percent rate of increase** after recovery.

Chapter 3 expresses the resulting effect on RVDs as percent change from existing.

Hunting and Fishing Opportunities

Hunting and fishing opportunities in the future depend on many variables, none of them objectively available and most of them difficult to predict.

Rather than predict actual number of hunting days, Chapter 3 describes changes in hunting opportunity narratively. The state of the art of predicting recreation use changes in a small area after development is not advanced to the point where exact numbers can be predicted with any confidence.

VISUAL QUALITY ANALYSIS

Developing VQOs

Topographic **quad map** overlays on file in the Supervisor's Office show VQO allocations for the Forest. The following paragraphs summarize how VQOs were developed for the area.

The four basic elements of a forest landscape are form, line, color, and texture. Landscape architects can inventory, categorize, and analyze the forest scenery by analyzing these elements.

The Forest Service manages the visual resource through its visual management system. The system assigns one of several VQOs to each acre of land. These objectives describe how much change is acceptable in the existing landscape. Project activities are expected to meet or exceed that objective. VQOs are based on viewsheds, or the areas seen from sensitive viewpoints.

The visual management system uses three elements to evaluate visual resources and to establish VQOs:

1. **Distance Zones** - There are three zones. **Foreground** (fg) is the distance at which detail such as tree limbs can be identified, usually 1/4 to 1/2 mile from the observer. **Middleground** (mg) extends from foreground to 3-5 miles from the foreground; texture is emphasized. **Background** (bg) is everything beyond middleground; colors and patterns dominate the visual impression. Distance zones are measured from key viewer vantage points such as trails, roads, and lookouts.

2. **Variety Classes** - These classify the physical features of the landscape, such as **landforms**, vegetation patterns, and unique features. The three variety classes are: A. Distinctive, B. Common, and C. Minimal.

3. **Sensitivity Levels** - These classify the landscape's sensitivity, which is the public's level of concern for the specific landscape. Level 1, the highest, is all areas seen from primary travel routes where, at a minimum, at least one-fourth of all Forest visitors have a major concern for scenic qualities. Levels 2 (average) and 3 (lowest) reflect lesser degrees of public concern for scenic qualities. Since nearly all visitors have at least some visual concern in the roadless area, no lands are Level 3.

Each area of the Forest has been inventoried for the above components. Following a formula, the three components—distance zone, variety class, and sensitivity level—combine to determine a visual quality objective assigned by the Forest Plan. Three VQOs apply to this part of the roadless area:

1. **Retention** - Management activities are not visually evident to the casual observer.

2. **Partial Retention** - Management activities remain visually subordinate to the characteristic landscape.

3. **Modification** - Management activities may visually dominate the landscape, but must borrow from naturally established form, line, texture, and color so they appear similar to natural occurrences.

The visual management system is summarized in the publication, **National Forest Landscape Management, Volume 2, Chapter 1, The Visual Management System**, USDA Forest Service Agriculture Handbook 462, April 1974.

Methodology

Effects on the visual resource were analyzed by following the standard process outlined in the Forest Service visual management system (USDA Forest Service 1973) and Forest Service Manual 2380. The alternatives for proposed timber sales were measured against the visual quality objectives (VQOs) established in the Forest Plan. The Figure at the start of the Visual Quality portion of the Recreation Resources section of Chapter 3 shows the VQOs in the sale areas.

To what degree the alternative meets the VQOs is determined by comparing the alternative's map against the Forest Plan VQO map and the visual implementation guidelines from the Forest Plan, Appendix B, Recreation. These guidelines are summarized in the document "Visual Quality Objective Implementation Guide 1/4/91" in the planning records. This process may identify harvest units that on paper do not meet the VQO. It then becomes the task of the District timber management staff in site-specific sale design and layout to modify the mapped harvest units to meet the VQOs. Mitigation measures to accomplish this are listed in Chapter 2, Mitigation Measures and Management Requirements. If implemented, these measures would reduce or avoid the impacts to the scenery to varying degrees by alternative, thereby meeting the visual quality objectives.

MTVEST ANALYSIS

Recreation is part of the economic picture of a timber sale; it has both costs and benefits. Present net value (PNV) is the measure of economic efficiency. The MTVEST economic analysis calculates the PNV of each alternative. It adds together all dollar benefits of a timber sale, and subtracts all dollar costs. Chapter 3 shows the costs and benefits. For recreation and visual resources, they are:

Costs: Recreation Management, Visual coordination, Cultural Resource Coordination, and Recreation Coordination. These are expressed in 1992 dollars.

Benefits: Big-game Hunting, Cold Water Fishing, and Dispersed Recreation. These are expressed in wildlife user days (WUDs), fish user days (FUDs), and recreation user days (RVDs), respectively. They are multiplied by Forest Service-wide assigned dollar benefits for each activity.

To determine hunting use for the MTVEST model, the basic assumption was that big-game hunting would continue as a constant proportion of recreation visitor days, the same proportion as at present. The same assumption applied for fishing use (in areas with fishable streams).

No anadromous fish user days occur on Payette National Forest streams themselves. The existing anadromous fish populations are small because of the overall depressed populations. Any changes expected from the timber sales, if any, would be minuscule or non-existent and would occur in the distant future, thus representing minuscule economic value. For these reasons, anadromous fishing does not factor into MTVEST.

For further specifics of analysis of recreation-related resources, see "Documentation of Assumptions and Methodology" in the planning records.

APPENDIX F - ROADLESS ANALYSIS

ROADLESS AREA ANALYSIS HISTORY

RARE I AND II

The National Forest's roadless areas have been analyzed for wilderness and other resource potential several times in the past decades by the Forest Service and Congress. In 1972 the Forest Service conducted the first Roadless Area Review and Evaluation (RARE I). In 1979 the Forest Service completed the second Roadless Area Review and Evaluation (RARE II) and published a final environmental impact statement recommending areas for wilderness, non-wilderness, and further planning.

The State of California and others challenged RARE II as insufficient to support non-wilderness allocations, and the District Court and the Ninth Circuit Court of Appeals ruled it legally inadequate. The Forest Service then amended the Forest Planning process to include a roadless area re-evaluation, leading to a land allocation of each roadless area to either wilderness or non-wilderness.

The French Creek/Patrick Butte Roadless Area was analyzed in RARE I and in RARE II (code #4-461) and re-evaluated in the Forest Plan EIS (code #12002, 168,215 acres).

FOREST PLAN

The Forest Plan allocated the entire French Creek/Patrick Butte Roadless Area to non-wilderness, but with about 70 percent remaining undeveloped, as follows:

Management Prescription	Acres
Undeveloped Recreation	116,852
General Forest Management	49,874
Research Natural Area	1,489
	168,215

The supporting analysis for that decision is documented in Appendix C, Roadless Area Evaluation, of the FEIS for the Forest Plan (USDA Forest Service 1988).

WILDERNESS LEGISLATION

In the past few sessions of Congress, several versions of an Idaho wilderness bill have been introduced, but none has been enacted. Two bills were introduced in the 1988-9 session. H.R. 2213 by Rep. Peter Kostmayer (D-Penn.) would have designated as wilderness the entire French Creek/Patrick Butte Roadless Area. This bill was known as the Moody-Kostmayer bill, and was introduced again as H.R. 5944 in 1992. S. 371 by Senator James McClure (R-Idaho) would have released the roadless area to non-wilderness. This was known as the McClure-Andrus bill.

The Idaho Wildlands Defense Coalition has a wilderness proposal that closely resembles the 1992 Kostmayer Bill, including a French Creek/Patrick Butte Wilderness.

The unresolved Forest Plan appeals and the issues identified during this EIS planning process indicate that the public controversy surrounding roadless areas and potential wilderness still remains.

BOUNDARY ADJUSTMENTS

The RARE II and Forest Planning processes established and used general boundaries of the roadless areas based on maps then available. Closer study in connection with on-ground analysis of these and other proposed sales identified the presence of a few roaded and developed areas within the areas previously mapped as roadless.

In some cases, the areas were harvested in timber sales under the unit planning process of the 1970s and 1980s; for example, roads and clearcut units near Elk Meadows. In other cases, personnel were not aware that some areas had been partially logged in the past. In others, mapping errors were responsible.

Therefore, in 1989 Forest personnel undertook a "Roadless Area Boundary Adjustment" process. Details are in the planning records. The process updated the boundaries of the French Creek/Patrick Butte Roadless Area to remove clearly developed areas, primarily roaded and logged acreage. The adjustments only affected the edges of the roadless area. On closer inspection along one boundary, the roadless area expanded. Overall, the net result was an acreage reduction of 7,420 acres from the original 171,575 acres of the entire roadless area. The new acreage was 164,155.

The Accelerated Engelmann Spruce Salvage Sales, approved in 1992, developed another 2,219 acres within the roadless area. Thus,the current (1993) acreage is 161,936. Site-speciic investigation within the Hazard Helicopter planning area turned up 30 additional acres mapped as roadless that are actually developed. This adjustment to the inventoried roadless area boundary has been made.

METHODOLOGY

The effects of development to the roadless area were determined by overlaying a map of each alternative over the topographical base map of the roadless area. In conjunction with aerial photos, ground photos, roadless area descriptions in Forest Plan Appendix C and elsewhere, and knowledge gained from field visits in 1989-1992, the overlay allowed the extent and degree of effect to be seen and described in terms of acres and the five wilderness attributes.

ROADLESS AREA DESCRIPTION

This section describes the roadless character and wilderness qualities of the roadless area.

The French Creek/Patrick Butte Roadless Area covers 161,936 acres of Payette National Forest land between Payette Lake and the Salmon River. It stretches from near Payette Lake on the south to near the Salmon River on the north; and from the Warren Wagon Road on the east to near Highway 95 on the west. It lies in two lobes. The eastern half runs from Bear Pete ridge through the headwaters of French Creek to Brundage Mountain, and the western half extends from Patrick Butte to Granite Mountain. The lobes are separated by the Hazard Lakes Road/Elk Meadows road network except for a narrow roadless connector north of Elk Meadows. (See Figure RO-1).

The roadless area lies about 20 to 30 miles north of McCall, and 120 to 150 miles north of Boise. Its nearest points are about a 20-minute drive from McCall, New Meadows, or Riggins.

It is a rugged landscape with steep river breaks, subalpine and alpine meadows, glacially carved basins and valleys, and over 50 lakes. Elevations range from 3,200 feet to over 8,800 feet. The rock types vary widely; most are granitic and meta-granitic, with some basalts on the west side. Soils weathered from the granitics are coarse, sandy, and light colored; soils weathered from the basalts are fine, silty, and dark-colored.

The very diverse vegetation types range from old-growth forest to scattered pines to meadows to grasslands. Forest types include ponderosa pine, Douglas-fir, grand-fir/Douglas-fir, mixed conifer, Engelmann spruce/subalpine fir, lodgepole pine, and whitebark pine. The Forests are interspersed with areas of riparian, aspen, perennial grassland, mountain brush, subalpine meadows, and bare rock cliffs and outcrops. Snowfields linger well into summer at the highest elevations.

Vegetation types are distinctly influenced by fire. A fire mosaic pattern is visible to a trained eye in many forested areas. The Forest Service has suppressed wildfires for most of this century. An unintended effect of this successful fire exclusion and resulting decrease in historic fire frequency has been to allow forest succession to proceed toward shade-tolerant tree species and mature successional stages. Species composition has gradually changed. For example, under shaded ponderosa pine stands, regeneration is now mostly Douglas-fir and grand fir/ Under Douglas-fir stands, it is mostly grand fir. Under lodgepole pine stands, it is often subalpine fir and some Engelmann spruce.

In layered stands, the overstory of old-growth conifers is relatively susceptible to insect and disease mortality, while the understory in places is increasingly becoming shade-tolerant grand fir. The Engelmann spruce bark beetle infestation of the last several years has killed virtually all mature and older spruce trees in most parts of the roadless areas and attacked many of the large survivors. The large amount of standing and fallen dead spruce is increasing the potential risk and intensity of wildfires.

The roadless area provides habitat for a wide variety of game and non-game wildlife species. French Creek offers anadromous fisheries habitat, and the other creeks flow into anadromous streams. Moose may be increasingly entering the roadless area, and gray wolves (an endangered species) have been reported but not confirmed.

Recreation consists of a wide variety of high-quality, low-density backcountry activities—big-game hunting, camping, fishing, horse packing, backpacking, motor biking, ATV riding, mountain biking, day hiking, and others. The area has clean air, natural sounds, peace and quiet, scenic vistas, and freedom from the reminders of civilization.

Cattle grazing around the edges of the roadless area, and sheep trailing and camping in meadows, leave physical impacts and reminders of their presence in places they congregate.

Placer mining decades earlier in Fall Creek, Blacks Creek, and Josephine Creek modified several stretches of stream and left tailings and remains visible today.

The Lava Ridge National Recreation Trail crosses the roadless area from south to north. French Creek is a proposed wild and scenic river study corridor.

ROADLESS/WILDERNESS CHARACTERISTICS

Natural Appearance

The roadless area appears highly natural. Mining and grazing have had visible effects in localized areas but are not prominent overall. Old cabins are scattered in places near mining areas, range developments are visible around the edges, and hunter's camps are scattered widely. Two fire lookouts—one abandoned—and several cleared helicopter landing spots are visible from a distance. Recreation trails thread through the area and are visible at close range, but serve mostly to disperse users. Air is nearly always clean except during fall slash burning or agricultural burning periods when prevailing winds blow smoke through the valleys. Otherwise, visibility is usually excellent and human-caused pollutants are essentially absent. Some distant views reveal clearcut blocks and logging roads, but they lie just outside the roadless area.

Natural Integrity

The area's natural integrity is high. Fifty years of fire suppression have let natural succession move the forest toward climax stages in most places. Some recent wildfires show evidence of human firefighting. Sounds of logging nearby are sometimes audible in summer and fall within the roadless areas, and smoke from slash burning often clouds the views in the fall. Sheep grazing each year has reversed the natural succession of the range and has left some areas with sparse ground cover and eroded soils. While most lakes and streams have native fish, many of the larger ones also have planted or introduced species. The native chinook salmon have all but disappeared from their native habitat in the tributary streams above the Salmon river and Little Salmon River, due primarily to the effects of several major dams on downstream rivers.

Opportunities for Solitude

The roadless area is relatively large, has rugged canyon and ridge topography, has considerable tree cover, is moderately remote to reach, and has a trail system that disperses use. These factors keep the opportunities for solitude very high. The only noises interrupting the solitude are an occasional jet, motorbike, or logging operation nearby. Exceptions would be along or above the paved road on the east side and the network of logging roads in the center, where vehicles can be seen and heard and dust clouds are visible.

Opportunities for Primitive Recreation

The chances for primitive outdoor recreation are excellent. The 5,600-foot variety in elevation, diverse topography, water bodies, and vegetation patterns combine to offer exceptional opportunities for many forms of primitive recreation, including big-game hunting, camping, backpacking, hiking, fishing, peak bagging, cross-country skiing, ski mountaineering, photography, plant study, wildlife observation, and gathering forest products. Although many roads pass near the boundaries, much of the area is not easily accessible, especially in the northwest portion. Trails provide access to several dispersed portions of the perimeter and interior. The diversity of animal species offers outstanding opportunities to view wildlife, including elk, deer, bighorn sheep, black bear, pine marten, golden eagle, osprey, ducks, goshawk, pileated woodpeckers, and many more.

Special Features

The roadless area contains several unique and scenic features. There have been several moose sightings and reports of grey wolves. One sensitive plant, *Saxifraga bryophora* var. *tobiasiae*, grows near Fisher Creek saddle, and another grows near Hard Creek, *Halimolobos perplexa* var. *perplexa*. French Creek and the headwaters of Little French Creek are a proposed wild and scenic river study corridor. Over 50 lakes and many distinctive glacial cirque basins dot the higher elevations of the roadless area's western half. The Lava Ridge National Recreation Trail passes through the area. Three proposed research natural area and one proposed national natural landmark lie within the area. Rare stands of birch grow in places, as well as stands of Pacific yew near the southeastern edge of its range. Moose are also reported here near the southwestern edge of their range.

PUBLIC SENTIMENT

There is strong disagreement about future management for the French Creek/Patrick Butte Roadless Area; some want it preserved for wilderness, and others want it managed for commodity production. During RARE II, the vast majority of public comments on this area favored wilderness designation. During the 1983 roadless area re-evaluation, this area was in the top five areas for public comment and support for wilderness. The Idaho environmental groups' wilderness proposal includes a French Creek proposed wilderness encompassing the entire roadless area. Comments on French Creek on the Forest Plan also indicated broad support for keeping the French Creek area roadless for its watershed, fisheries, recreation, big game and other wildlife, and non-motorized recreation uses.

Further general description of the French Creek/Patrick Butte Roadless Area and its wilderness attributes appears in the Forest Plan's Final EIS, Appendix C, pages C-29 to 35 (USDA Forest Service 1988). That description is herein incorporated by reference.

PROPOSED SALES WITHIN THE ROADLESS AREA

The Forest Plan proposes six sales in the roadless area in the next few years. All, or nearly all, of the Freight Landing, French Creek, Hazard Helicopter, and Lower Elkhorn proposed sales lie within the roadless area, as do portions of the Fourmile and Jenkins proposed sales. The Forest Plan allocated the roadless area to a mix of prescriptions, primarily four: general forest management (including timber management), backcountry management with limited timber harvest, backcountry with no timber management, and proposed research natural area. Nevertheless, public opinions remain divided over the allocation. The allocation of the roadless area is a major issue in appeals on the Forest Plan and the subsequent appeals negotiations that are yet unresolved. Interest remains high regarding the effect of development on the roadless character and on the wilderness potential of the roadless area.

In addition to the six near-term sales, the Forest Plan Activity Schedule also lists several sales in the outyears of the planning period. These outyear sales are listed in Chapter 1 of this Draft EIS.

ROADLESS AREA SUMMARY

Table F-1 shows the acreage eligible for wilderness in the planning areas of the roadless area, and in the total roadless area.

Table F-1. Acres Eligible for Future Wilderness Consideration

Planning Area	Acres	Percent of Roadless Area
Fourmile	3,200	2.0
Freight Landing	2,600	1.6
French Creek	6,900	4.3
Hazard Helicopter	3,350	2.0
Jenkins	2,550	1.6
Lower Elkhorn	2,400	1.5
Total	21,000	13.0
French Creek/Patrick Butte Roadless Area:	161,936	100

APPENDIX G
SILVICULTURAL PRESCRIPTIONS AND CONSEQUENCES

This appendix describes the silvicultural prescriptions used in this EIS and the timber consequences of applying them. The information pertains specifically to the mixed conifer stands on the Payette National Forest and may not apply elsewhere. For consequences of even-aged or uneven-aged management on other resources such as Soils, Wildlife, or Recreation, see the specific sections in Chapter 3. Technical terms used in this section are defined in the Glossary, Appendix C.

This Appendix is organized in three parts:

A. Even-aged Management,
B. Uneven-aged Management, and
C. Timber Stand Improvement Practices.

A. EVEN-AGED MANAGEMENT - DESCRIPTION AND CONSEQUENCES

Most natural forest stands on the Payette National Forest are essentially even-aged and have developed a one- or two-storied structure as a result of wildfire, windstorm, insects, or diseases. Irregularities occur as the stands age and move through various stages of succession until natural events again begin a new stand. Even-aged management often attempts to emulate the natural **seral** stand structure while controlling conditions that cause slow growth and mortality. (Seral means in the early stages of succession. Seral species are also **shade-intolerant.**) For management purposes, an even-aged stand is defined as being composed of trees with ages ranging less than 20 percent of the rotation span (for example, if the rotation age for a stand is 100 years, then the age of the trees would not vary by more than 20 years). In intensive forest management, stocking and species are controlled by planting and thinning to maximize growth and value. The stands are harvested and regenerated when the optimum growth slows. The Forest Land Management Planning process, completed in 1988, analyzed the timber resource and determined that 96 percent of the total suited timber acres should be managed using even-aged management systems.

Even-aged management is the manipulation of timber stands for periodic regeneration of desirable tree species, the orderly growth and development of these trees to a given size, and the development of these stands to provide a sustained yield of forest products. Managed even-aged forests are characterized by a distribution of stands of varying ages (size classes) throughout the forest. Regeneration occurs at or near the time of complete harvest when the stand reaches the desired age or size. Stands are treated between harvests with thinnings, cleanings, or other stand improvement treatments designed to promote growth and improve stand quality (USDA 1976).

To reduce the impacts from insects and disease, the preferred harvest cutting methods are ones that encourage tree species diversity, growth and vigor, and stand size-class diversity. These elements can best be achieved through even-aged management (USDA Forest Service 1984, Intermountain Regional Guide, page 3-19). Even-aged prescriptions are often required to treat **dwarf mistletoe** infected stands. (Dwarf mistletoes are small parasitic plants that grow on many species of conifers.) The single canopy layer and mixture of seral species also reduce stand susceptibility to spruce budworm and Douglas-fir tussock moth.

Even-aged management can utilize several cutting methods to achieve even-aged stands. These cutting methods are clearcuts, seedtree cuts, and shelterwood cuts, as well as variations of these basic methods. While each stand is composed of trees of about the same age, adjacent stands are usually of a different age, creating a wide variety of ages and sizes within the forest. Even-aged stands do not mean monocultures. Where site conditions allow, a variety of tree species can be regenerated to provide species diversity and greater resistance to insects and disease. Regeneration occurs at a single distinct point in time and can be readily controlled by the trees left for a seed source or by planting. Where the desired future condition is for shade intolerant (ponderosa pine, lodgepole pine, and western larch) or **intermediate** species (Douglas-fir), even-aged methods should be considered because of the greater potential volume production and reduced administrative costs (USDA 1976).

Inventory of stands to be harvested by even-aged management prescriptions requires a sample of tree species, size, volume and stocking. After harvest and regeneration, another sample would describe the young stand. This regeneration survey and any subsequent surveys during the rotation are relatively simple—counting tree numbers, sizes, and species.

Skidtrails in even-aged harvest units are normally put back into timber production after use. If compaction exceeds Forest Plan standards, the compacted areas are ripped to a depth of 15-20 inches to assure that growth and development of the new trees are not restricted.

The maximum size for openings created in one harvest operation by even-aged management is 40 acres. To exceed this limit, Regional Forester approval is required (Forest Plan, IV-65).

The next three sections describe the even-aged silvicultural prescriptions and their consequences.

1. Clearcut Prescription

See Figure G-1 for an illustration of the clearcut system.

Clearcutting removes all the **merchantable** (meeting standards for minimum size and soundness) trees at one time, setting a stand back to early stages of succession. It most nearly matches the role formerly played by stand-replacing wildfires or windstorms (Burns 1989). Grasses, forbs, brush, and intolerant tree species are the first types of vegetation to become established. Like a wildfire, this may not be ecologically harmful, but may produce a significant visual impact to the casual observer until the new timber stand reaches 10 or more feet in height. Use by wildlife also varies as the stages of succession change.

With the harvest of all the merchantable trees, generally there is little damage to residual trees outside the cut area, and many insects and diseases are automatically controlled. **Advanced regeneration** (small, unmerchantable trees) within the harvest unit is generally destroyed unless it occupies an area large enough to be managed separately. On steep ground (over 45 percent slope) where skyline logging systems must be used, clearcutting also results in fewer damaged trees and is more cost efficient than other silvicultural systems.

This method of harvest allows the most flexibility in slash disposal and site preparation for regeneration. Large woody debris may be left while fine fuels are reduced with broadcast or pile burning. **Scarification** (exposing mineral soil for seedling establishment) can be done quickly and without concern for residual tree damage. As with all harvest prescriptions, care must be taken to avoid soil compaction during logging and slash disposal. Costs for slash disposal and site preparation are usually lower than for other harvest methods.

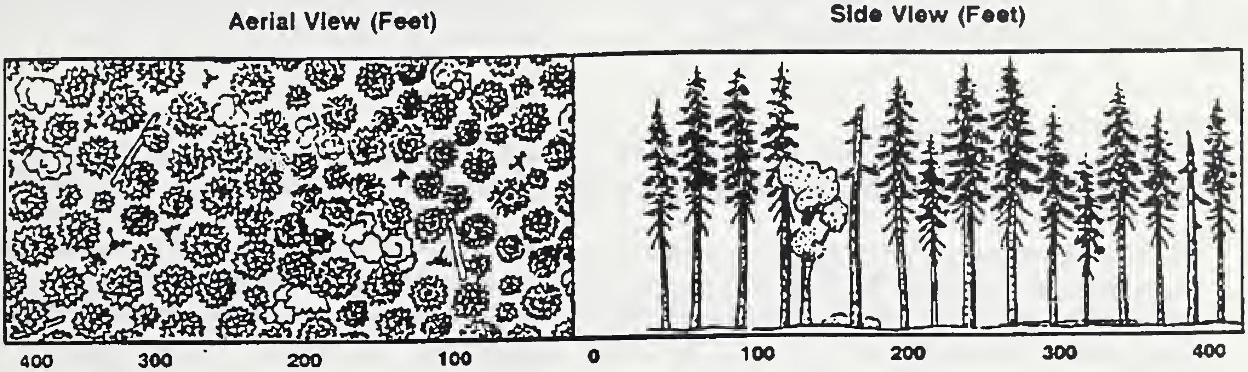
Clearcutting prescriptions in this EIS allow and encourage where feasible the retention of advanced regeneration suitable for future crop trees. These trees should have good form, have at least 25 percent live crown, be young enough to have good future growth potential, and be free of insects and disease. In addition, selected **windfirm** (resisting blowdown) **reserve trees** (those left in a harvest unit for wildlife or other resource purposes) will be retained. Wildlife biologists or other knowledgeable personnel will identify wolfy trees or snags for retention. These reserve trees should provide good perching sites for raptors and **insectivorous** (insecG-eating) birds, and give security to foraging mammals such as pine marten and black bear. Trees that pose a safety hazard will not be retained. The most desirable wildlife trees are 20" diameter breast height (DBH) or more with large branches. Trees should be located to provide access to the created opening for hunting and flycatching. Some live wildlife reserve trees may pass on poor genetic qualities or disease to regeneration and are occasionally a silvicultural concern. Forest personnel would consider **girdling** (cutting through the bark around the tree) to kill those reserve trees and prevent harm to regeneration while providing wildlife habitat. Leaving wildlife trees in a clump or adjacent to small cut units (rather than scattered over the area) minimizes seed dispersal and enhances the wildlife benefits to certain species. Adjacent riparian or non-commercial stands may also provide ideal sites for snag and wolfy tree retention.

Clearcuts are the most effective method for treating stands heavily infected with dwarf mistletoe. This parasite is spread from overstory trees to trees of the same species in the understory. Leaving infected overstory trees for seed, shade, or wildlife benefits allow the infection to spread to the newly regenerated stand. Dwarf mistletoe causes reduced growth, deformity, and eventual death of the infected tree (USDA Forest Service 1978).

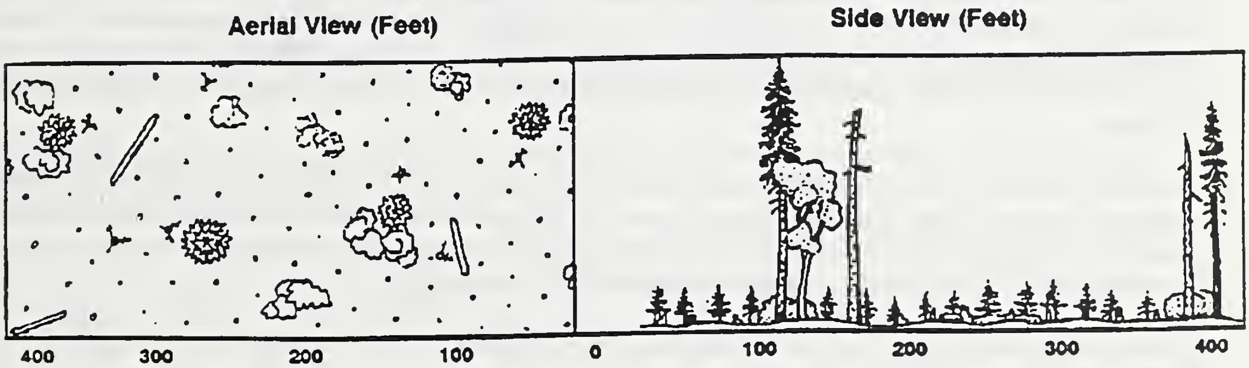
Several species of damaging bark beetles breed under the bark of green slash. Burning can effectively reduce this threat. Clearcutting allows for the most efficient treatment of slash to reduce the potential for insect build-up.

Clearcutting is often prescribed on the Forest for several reasons. It quickly converts slow growing stands of climax tree species to more commercially valuable, rapidly growing seral species. Many of the older unmanaged stands have insect and disease problems that are best treated by starting over with a new stand. Clearcutting removes suppressed, deformed, and undesirable trees which take up growing space but contribute little toward future sawtimber crops. It is often the most efficient system for harvest, slash disposal, site preparation, and planting. Costs are usually lower, manpower needs are less, and the potential to damage a residual stand is eliminated.

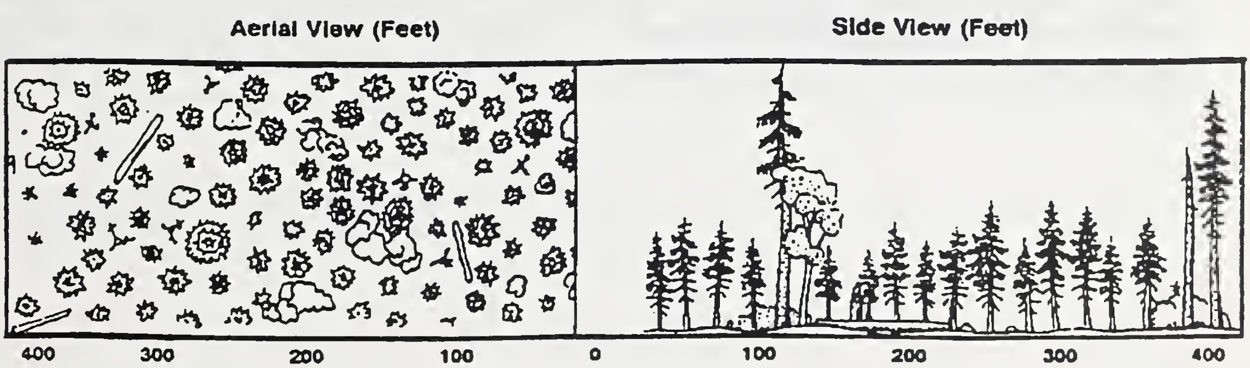
Figure G-1. Clearcut Harvest System



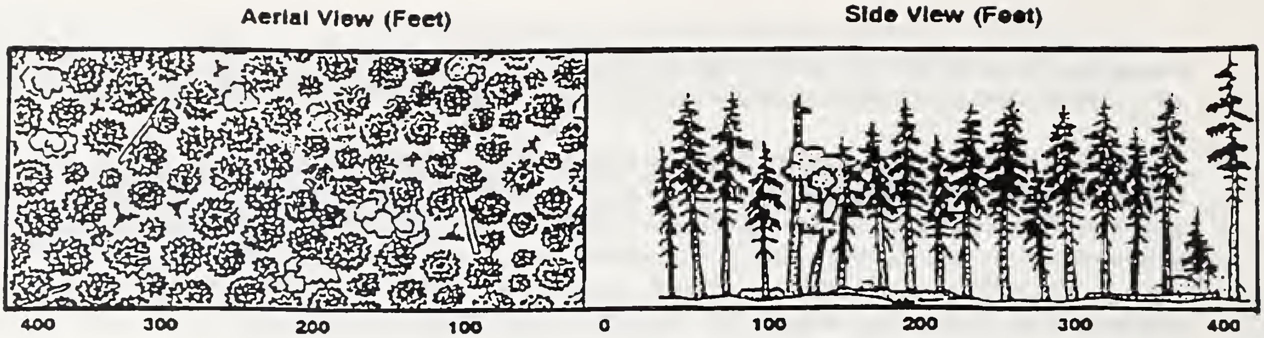
This stand is even-aged and mature to overmature. Many trees are growing slowly and there is some mortality. The dying and dead trees create small openings in the canopy which promote the growth of some understory brush and tolerant tree seedlings.



After harvest nearly all the merchantable trees have been removed. Small groups of green trees and snags are reserved for wildlife.



Thirty years after clearcutting, reserve trees are aging and are serving as replacements for those snags which have fallen. Young stand vigor has been maintained by precommercial thinning the dense stand where needed.



Sixty years after clearcutting, the stand canopy is closing. Individual tree growth is beginning to decline and a commercial thinning may now be appropriate.

2. Seedtree Prescription

See Figure G-2 for an illustration of the seedtree harvest system.

Seedtree harvest involves the removal of all but a few trees (typically 3-10 per acre) for seed production. Only high value, windfirm, intolerant species such as ponderosa pine, Douglas-fir, or western larch should be left in seedtree units. Leave trees should also be of good form, healthy, and young enough to produce large amounts of seed. Currently there are relatively few opportunities for seedtree units in old-growth stands on the Forest due to the existing condition of the trees.

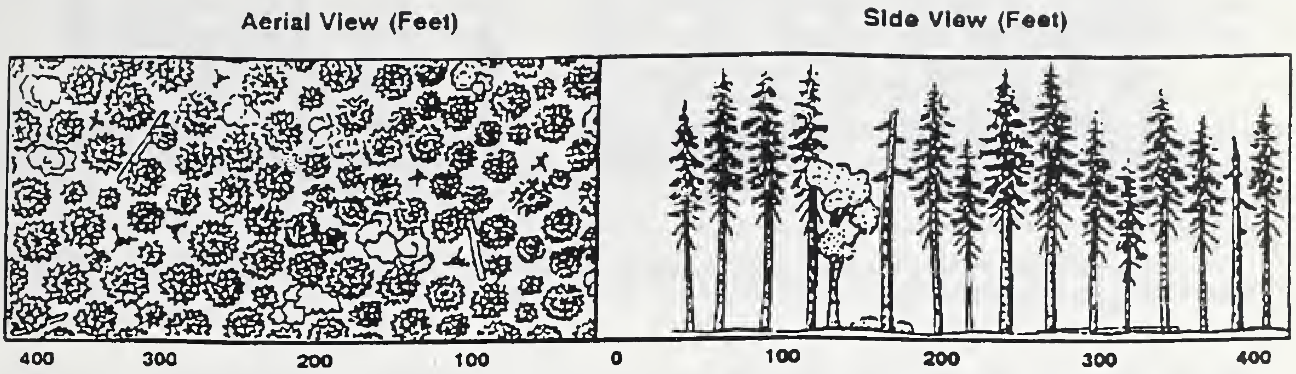
On seedtree cuts, it may be uneconomical to return to the area to remove the seedtrees once the new stand is established. In some cases they may be harvested, but often they would be left until the next commercial thin or regeneration cut in 60 to 100 years. The volume of these trees is foregone for this harvest and may be lost due to mortality before the next commercial entry. In addition, while these seedtrees continue to grow, the space they occupy would not produce the rapid growth of younger trees. On the other hand, these trees improve vertical diversity, provide possible future snags, increase raptor perch and nest sites, and improve visual diversity once the young stand occupies the site.

Seedtree cuts have many of the same characteristics as clearcuts. Usually not enough trees are left to provide visual mitigation during the first years after harvest. Some wildlife species may benefit from the scattered seed trees, but the general benefits and concerns about clearcutting also apply to seedtree cuts. Because damage to the seedtrees must be avoided, slash disposal and site preparation may be slightly more costly.

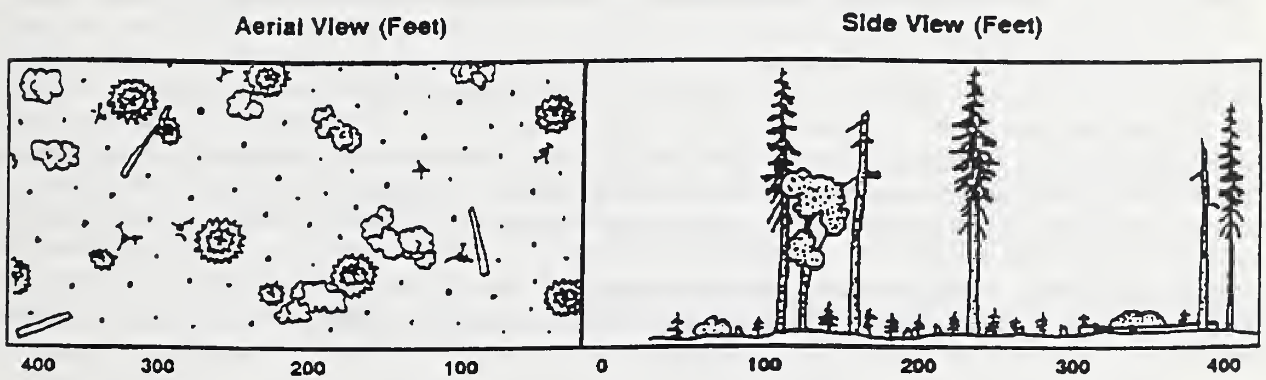
As long as the seedtrees left are healthy, seedtree prescriptions provide the same insect and disease benefits as clearcuts.

The Forest seldom uses true seedtree prescriptions because planting is most often the preferred regeneration method. Planting is done for a variety of reasons (see "Planting and Natural Regeneration", section C.1, in this Appendix) and would defeat the purpose of this silvicultural system. If selected trees are left for reasons other than seed production (such as wildlife or visual quality), the prescription is more accurately described as a clearcut with reserve trees.

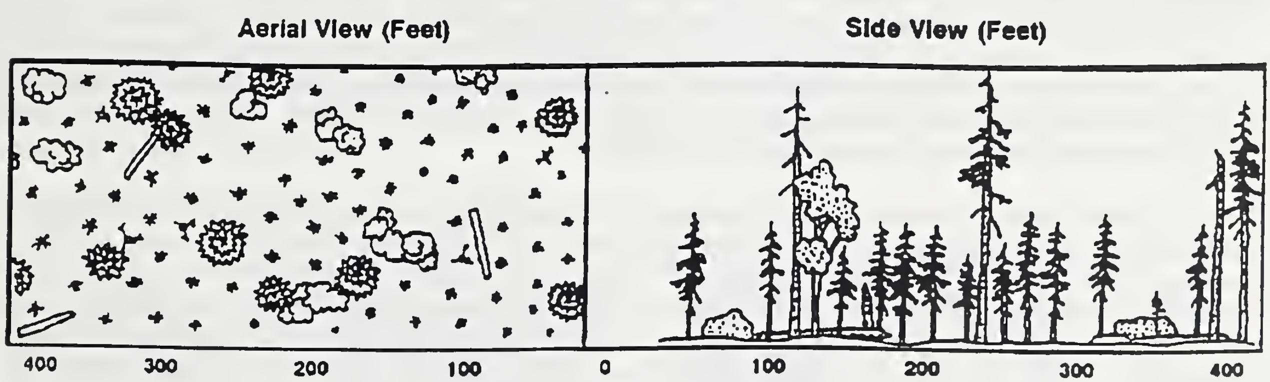
Figure G-2. Seedtree Harvest System



This stand is even-aged and mature to overmature. Many trees are growing slowly and there is some mortality. The dying and dead trees create small openings in the canopy which promote the growth of some understory brush and tolerant tree seedlings.



After the seedtree harvest, a few thrifty trees of desirable species are left as natural seed sources. Additional wildlife snags and reserve trees may also be left.



Thirty years after harvest, the stand continues to develop. The reserve trees retained from the original stand serve as replacement snags for those that have fallen.

Sixty years after harvest, the stand canopy is closing. Individual tree growth is declining and commercial thinning may be appropriate at this time.

3. Shelterwood Prescription

See Figure G-3 for an illustration of the shelterwood harvest system.

Shelterwood prescriptions also produce even-aged stands. The existing stand is removed in two or more harvests over a period of time. Occasionally a light preparatory cut (SW1) is needed to get the stand ready for the regeneration harvest (for example, to improve the windfirmness of the trees). The regeneration harvest (SW2) opens the stand to allow regeneration to become established, but leaves trees for seed and to shelter new seedlings from frost and heat damage. This regeneration cut usually removes most low value and less windfirm trees such as grand fir, subalpine fir, and lodgepole pine, as well as deformed or diseased trees of any species. If possible, only healthy, high value trees such as ponderosa pine, Douglas-fir, western larch, and Engelmann spruce are left. Generally, 15 or more trees with desirable characteristics are left per acre. The exact number depends on specific stand and site characteristics such as species, size, aspect, elevation, and soils. Shelterwood prescriptions in this EIS allow and encourage the retention of advanced regeneration suitable for future crop trees were feasible. These trees should have good form, have at least 25 percent live crown, be young enough to have good future growth potential, and be free of insects and disease. In addition, trees for visual mitigation or high value wildlife reserve trees of any species may be left to meet site-specific needs.

To accomplish successful harvests while retaining an overstory, intensive planning, experienced personnel, and careful logging are needed. Considerable damage can be done to the residual stand during felling and skidding operations any time trees are left on the site after harvest. The most common injuries are breakage of major limbs or the main stems of trees by the felling of adjacent trees, and the skinning of bark from the base of residual trees during log skidding operations. Usually most of the damage to residual trees is done by felling. Care in marking, **directional felling** (cutting down a tree so it falls in a desired direction), careful layout of skidtrails, and close supervision during logging are some of the major ways the remaining stand can be protected. Experienced marking crews must estimate potential felling damage and mark those trees most likely to be injured.

The final harvest in the shelterwood system is an overstory removal (SW3). The shelter trees are usually removed when seedlings are from one to eight feet tall, leaving the new stand free to grow. There may be some logging damage to the new stand as the shelter is removed. The larger the young trees, the more likely they may be damaged by falling and skidding operations. The shelterwood may be retained longer than necessary for seedling establishment (for example, for visual quality reasons). However, this would result in slower growth of the regeneration and more damage to the young trees when the overstory is finally removed. Replanting some of the openings created by the overstory removal may be necessary to achieve full site productivity.

Irregular shelterwood (ISW2) is a variation on the traditional shelterwood system. Through the regeneration period (SW2), the system is similar to a conventional shelterwood (Daniel et al. 1979). It departs from an even-aged system by eliminating the final removal cut (SW3); in other words, the overstory "shelter" trees are retained indefinitely. Thus, regeneration is followed by the maintenance of a two-storied stand for the balance of the next rotation. The number of overstory trees retained depends on such factors as esthetics and the silvics of the species to be regenerated (Long and Roberts, 1992).

Advantages of irregular shelterwood prescriptions include greater structural diversity and less costs and management complexity than most traditional harvest systems. Irregular shelterwood also avoids the frequent harvest re-entries necessary for uneven-aged management. When combined with prescribed fire in appropriate situations and the retention of snags and large down woody material, irregular shelterwood management potentially allows the continued use of stands by some old-growth dependent species of plants and animals. These stands may also be more visually attractive than either traditional even-aged or uneven-aged managed stands.

A disadvantage of the irregular shelterwood system is reduced volume at the time of harvest because merchantable trees are retained on the site (20-35 percent of the volume). Long-term growth of the stand would also decrease due to the space occupied by the slower growing overstory. Depending upon the number of trees retained, and the shade tolerance of the species managed, PROGNOSIS modelling has estimated long-term growth reductions of up to 20 percent (Long and Roberts, 1992). Finally, this system would be inappropriate in stands where trees are not windfirm, where the overstory is old and unlikely to remain through the next rotation, or where insect or disease conditions such as dwarf mistletoe would affect the new stand.

The shelterwood regeneration method can be used to move the stand vegetation to an earlier successional stage. The shelter trees moderate some of the environmental impacts that would occur in a clearcut. They provide shade, which reduces soil temperatures 10 to 30 degrees Fahrenheit, and help retain snow and soil moisture longer. Both conditions can increase the survival rates of some seedling species, but intolerant tree species will grow slowly until the overstory is removed. Natural regeneration usually occurs on the site although timing may be uncertain. On this Forest, many shelterwood units are planted to ensure adequate stocking and the desired seral species mix.

Visually, this harvest method can be much less objectionable than clearcut or seedtree cuts. If slash is disposed of and damaged trees removed, adverse visual effects are minimized (Burns 1989).

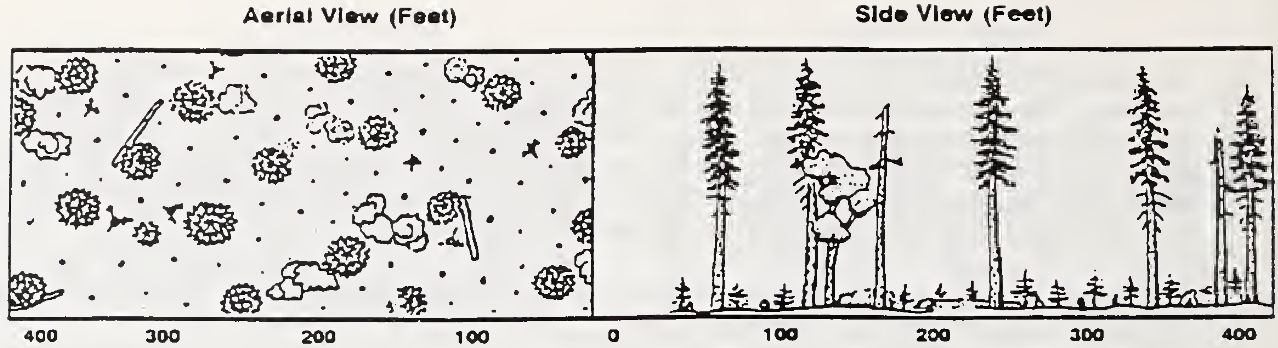
Slash disposal and site preparation are usually more difficult and costly because care must be taken to protect the residual trees from damage. Shelterwood cuts are also more difficult and costly to conduct on steep ground where skyline harvest is needed. The potential to damage reserve trees is high when cable yarding is used.

Shelterwood harvests are not recommended when the stand is infected with dwarf mistletoe. Any mistletoe left in the overstory will likely infect the newly regenerated seedlings. Other possible overstory problems include the potential of **windthrow** (blowdown) to shallow rooted species, and **sunscald** (heat damage from the sun shining on tree) of thin, previously shaded bark. Stress or damage to trees often increases the population of bark beetles in the stand.

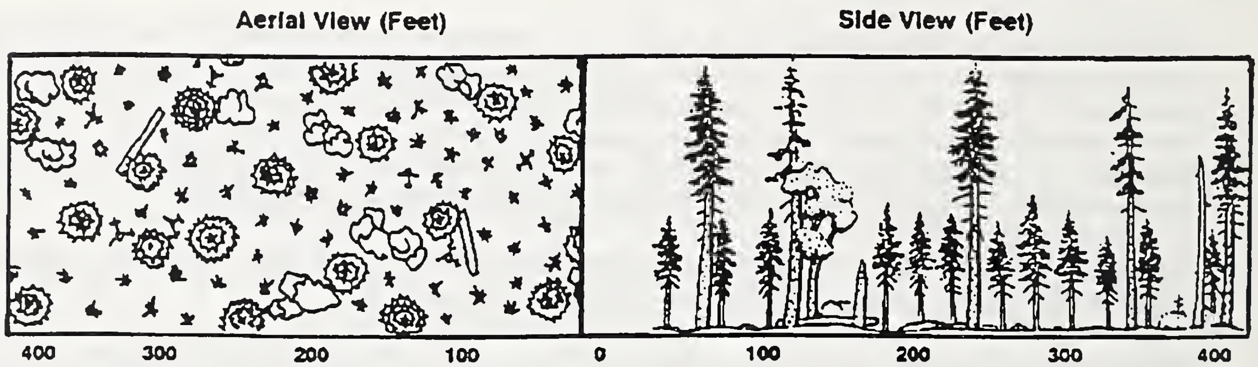
The Forest is increasing the use of shelterwood prescriptions. When compared to clearcuts, shelterwood units are much more visually acceptable to the public and provide a less harsh environment for newly planted seedlings. Since two separate harvests are needed to remove the original stand, costs are higher and volume at each harvest is lower than if clearcutting were used. The shelterwood system requires more care in sale preparation, logging, slash disposal, and site preparation and consequently returns less revenue to the Treasury. It also reduces the potential growth of the new stand for several years (until the overstory is removed). By varying the density of the shelterwood, however, this system can be used on many sites.

Figure G-3. Shelterwood Harvest System

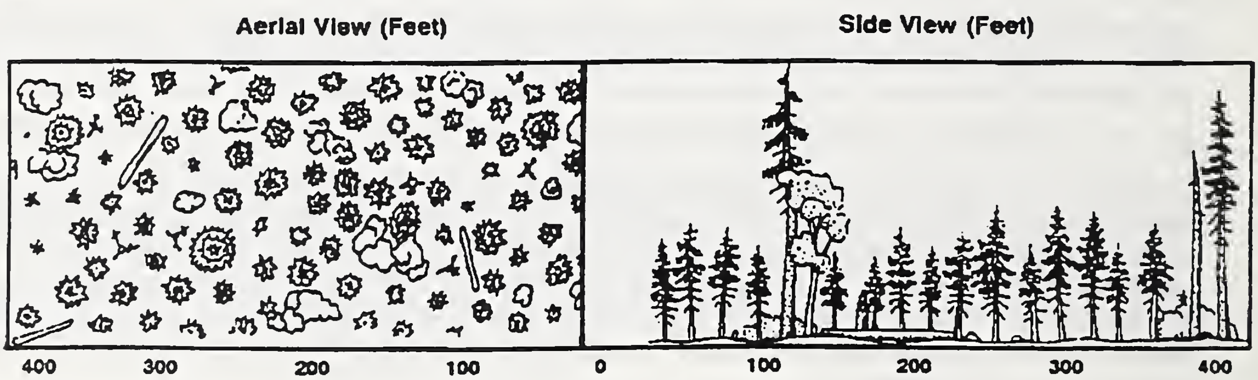
This stand is even-aged and mature to overmature. Many trees are growing slowly and there is some mortality. The dying and dead trees create small openings in the canopy which promote the growth of some understory brush and tolerant tree seedlings.



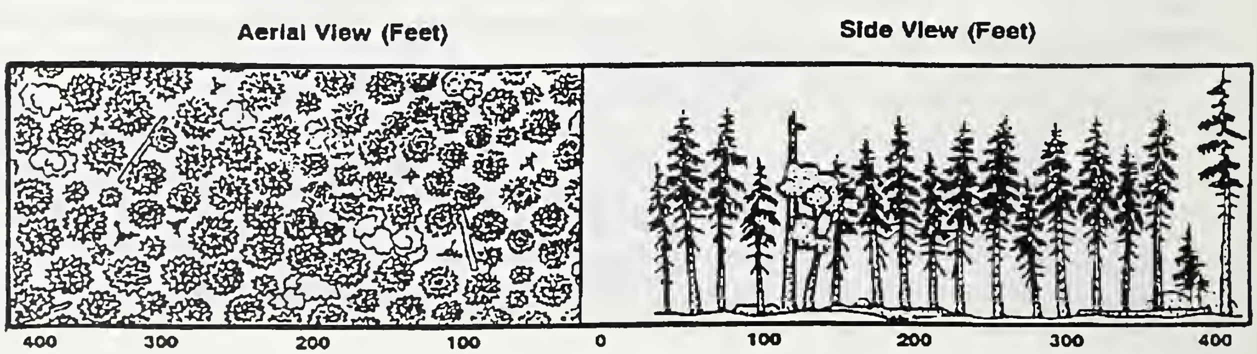
After harvest, there are a number (15+ trees per acre) of thrifty trees of desirable species left on the site. These trees provide protection for the new seedlings, as well as a natural seed source for reforestation, visual screening, watershed protection, and wildlife habitat.



Ten years after harvest, the stand has both the overstory and a young tree understory.



Within twenty years after harvest, the overstory has been removed except for wildlife reserve trees and snags. Some spot planting may be necessary to fill in the gaps left by the overstory removal.



Sixty years after harvest the stand canopy is closing and individual tree growth is beginning to decline. A commercial thinning may now be appropriate.

B. UNEVEN-AGED MANAGEMENT - DESCRIPTION AND CONSEQUENCES

Uneven-aged management is the manipulation of a forest for 1) continuous **high-forest cover** (overstory), 2) recurring regeneration of desirable species, and 3) the orderly growth and development of trees through a range of age or diameter classes to provide a sustained yield of forest products. Managed uneven-aged forests are characterized by trees of three or more ages or sizes. Trees are harvested singly or in small groups. The process of natural regeneration occurs continuously, or planting may take place after each harvest. Each harvest usually includes thinning and other stand improvement treatments to promote growth and maintain or enhance stand structure (USDA 1976). The same goals are used for each successive cut over an indefinite period. Stand-specific prescriptions and marking guides are prepared before entering each uneven-aged harvest unit.

Clearcutting has received increased public attention in recent years, primarily because of dramatic visual changes after harvest. Some people suggest uneven-aged management as a solution to the clearcutting controversy. Uneven-aged management has some definite advantages when managing shade-tolerant or climax tree species and in areas where recreation and visual quality are important considerations. Prescriptions written for dry ponderosa pine or Douglas-fir sites, for example, use uneven-aged management to meet timber as well as aesthetic objectives. For example, Powell (1987) gives guidelines for uneven-aged prescriptions for Douglas-fir in the Rocky Mountains of Colorado. Other timber types such as moist mixed conifer do not lend themselves as well to uneven-aged management when production of high-value seral timber is the main objective. Other advantages and disadvantages are also discussed later in this section.

The Payette Forest Planning process analyzed both even-aged and uneven-aged management. It determined that uneven-aged management should generally be limited to wet spruce areas, dry ponderosa pine and Douglas-fir habitat types, fragile slopes, and visually sensitive areas (Forest Plan, IV-63). Most of the other natural stands on the Forest have a generally even-aged structure and are composed of older trees. Converting these stands to an uneven-aged structure would be difficult and costly.

Stand inventories usually must be more frequent and include more information than in even-aged systems. More detailed records of species, volumes, size classes, stocking, cutting schedules, etc., are required for control of the cut. After harvest, examination of the remaining stand is required to determine what was accomplished in terms of species and stocking goals set. Since harvest may occur in the same stand every 20 years, inventory for regulation of sustained yield is more expensive than for even-aged management prescriptions.

To develop and maintain an uneven-aged stand, it is necessary to remove trees from all diameter classes at each harvest. This provides a suitable environment for regeneration and promotes growth of the remaining trees. A complication in mixed conifer stands is that various tree species have markedly different growing space requirements depending on their tolerance to shade. Species composition must be considered in evaluating desired stocking. In addition to calculating the number of trees desired by species, it is necessary to establish a diameter distribution goal, which shows the desired number of trees to be retained in each size class (USDA 1976). This requires an accurate inventory, intensive marking crew training, and frequent checks on marking accuracy. Since each stand is different, the number, species, and sizes of trees to be cut will change with each stand. In 1973, Boise National Forest timber markers estimated uneven-aged marking required 20 to 30 percent longer than marking for an intermediate (thinning) cut (Hall 1976). For more detailed information on dealing with stocking and diameter distribution goals, including inverse J shaped curves, Q factors and other methods, see the publications, Single-tree Selection Method, An Uneven-Aged Silvicultural System (Hamilton 1990), or Application of Uneven-Aged Silviculture and Management on Public and Private Lands (USDA 1976).

Research indicates growth through the first several harvests would be less than the stand potential because stocking, species composition, and slow growing trees are not fully managed. In some studies, even after the stand is fully managed, it was shown that the use of uneven-aged methods could result in a long-term reduction of timber yields as compared to even-aged management (Daniel, Helms, and Baker 1979).

Growth is also a significant factor when considering stand genetics. Studies have shown that tree age and diameter are often poorly correlated. This means that the oldest trees are not necessarily the largest trees. In uneven-aged harvest units, trees are usually marked for cutting by size rather than by actual age because determining the age of each tree is impractical. This may inadvertently result in retaining slow-growing trees for long periods of time. The slow grower,

after reaching sexual maturity, has many more chances of regenerating the site than the rapidly growing young-aged tree. An assessment of age in relation to diameter is important in all stands being managed using uneven-aged systems (Hamilton 1990). On the other hand, selecting trees for rapid growth is not always desirable. Slower growth may provide for improved wood quality in some species, but is difficult or impossible to determine under field conditions. Selecting for genetic qualities should be done under controlled, experimental conditions conducted by forestry research organizations. In the normal timber sale, the goal is to avoid degrading the natural genetic diversity.
The consequences of harvest activities are similar to those described for shelterwood prescriptions. Falling and skidding damage to the residual stand must be kept to a minimum because, in addition to immediate damage, scrapes to the bole (trunk of the tree) and limb breakage cause infection sites for heart and root rot fungi (Hamilton 1990).

Successful uneven-aged management requires a complete permanent road system for access during the frequent entries (about every 20 years) into the stands (Powell 1987). In tractor logging units, some of the skidtrails needed for harvest would be used during each entry. Proper skidtrail layout is important for these permanent skidtrails. They should be designed to minimize erosion and are seeded with grasses and waterbarred where needed. No trees are planted on these dedicated trails, and the acreage they occupy is removed from the timber base. About two percent of the area would be needed for these permanent skidtrails.

Care must be taken to avoid fuels build up and soil compaction due to the frequent entries into the same stands. Machine piling and burning would generally be confined to slash concentrations in small openings. See the Fuels consequences in Chapter 4, for more detail.

Site preparation for natural seeding or planting is difficult except where piling and burning is an option in small openings. Broadcast burning, underburning, or mechanical site preparation have to be carefully conducted to avoid damage to the residual stand. Regeneration can be achieved by natural seeding or by planting. Natural regeneration would tend toward the commercially less desirable, more shade-tolerant species. Planting is only practical in group selection openings, however.

The costs of managing uneven-aged forests are considerably higher than for even-aged forests. Each step of the management process requires more skill, training, data, and administration than does even-aged management. Due to the complexity, revenues to the Treasury would be lower and the likelihood of deficit sales would increase.

In addition to increased costs, professional skills needed to adequately implement uneven-aged management prescriptions are higher than for current even-aged management practices. An increase in journeyman-level field personnel would be needed if uneven-aged prescriptions become a significant part of National Forest management. Past experience suggests the chance of that increase occurring, with current emphasis on budget reduction and personnel controls, is rather remote.

The feasibility of uneven-aged management often depends on economics and factors other than species tolerance. Dr. Jerry Franklin, advocate of New Forestry, has said:

The shade tolerance of a preferred species or, more generally, the environmental conditions necessary for successful establishment and growth of regeneration, is rarely if ever, the major constraint in applying uneven-aged management. (Franklin 1976)

Composition can usually be handled by conducting group selection, underplanting, and other cultural operations. Other factors such as economics, impacts of road density, entry schedules, pathogens, wind, etc. tend to determine feasibility. It is technically possible to regenerate and grow intolerant species in patch cuts of 1/4 to 1 acre in size. Economically and environmentally, however, the costs are often too high on ordinary forest lands. (Franklin 1976)

Dr. Franklin continues:

It is not the intolerance of the species or the aggressiveness of its competitors that really limit the potential for uneven-aged management. It is, in fact, factors such as:

- the costs of harvest cutting in small groups
- the costs of cultural treatments to maintain the [desired species] component
- the damage done to boles, roots, and crowns of residual stems in felling and yarding the tall, large diameter trees

-soil and watershed damage associated with greater densities of roads and frequent stand entries
-possible reduction in yields. (Franklin 1976)

Uneven-aged management has two systems of harvest—individual tree selection and group selection. Both methods may be used in the same stand depending on site specific conditions. Most of the stands analyzed in this EIS are composed of mixed conifers. Group selection would be used most often to produce the conditions suitable for regeneration and growth of the more desirable seral species. The following describes the consequences of using each uneven-aged management prescription.

1. Individual Tree Selection Prescription

See Figure G-4 for an illustration of the individual tree selection system.

Each tree is evaluated on an individual basis for cutting, and individual trees are marked in the stand to improve spacing, produce regeneration, and favor the faster growing, more desirable species within the limits imposed by the stand structure goals.

Every cut under individual tree selection is a combination regeneration cut, harvest, and thinning. Many of the trees removed will be large enough to make merchantable products, although some smaller trees may also be cut to achieve stand structure goals and to provide more growing space for the remaining trees. The very small openings created by the removal of the individual trees would provide vacant growing space in which regeneration of shade tolerant species would get started. Subsequent cuts create new small openings so that continuous waves of regeneration occur, some of which gradually grow into the main canopy to replenish the trees harvested.

Reforestation in stands harvested by individual tree selection is usually through natural seeding of tolerant species. Planting would be very expensive as crews would have to search through the stand for suitable planting spots. Site preparation would also be expensive and difficult. Prescribed burning would have very limited application due to the potential to damage the remaining stand. Mechanical site preparation also requires great care in order to avoid damage to the residual trees. This system provides a protective canopy that may reduce frost damage to reproduction in high elevation stands and protects the seedlings from heat damage during the summer.

Single-tree selection cutting produces the least noticeable disturbance and leaves a stand that looks more like an undisturbed stand than any other cutting method. It is often the best cutting method to use in areas where aesthetics and recreation are priority values, assuming that the tree species present and desired are shade tolerant. Species like aspen and western larch, which add fall color and visual contrast year around, cannot be maintained with individual tree selection (Burns 1989).

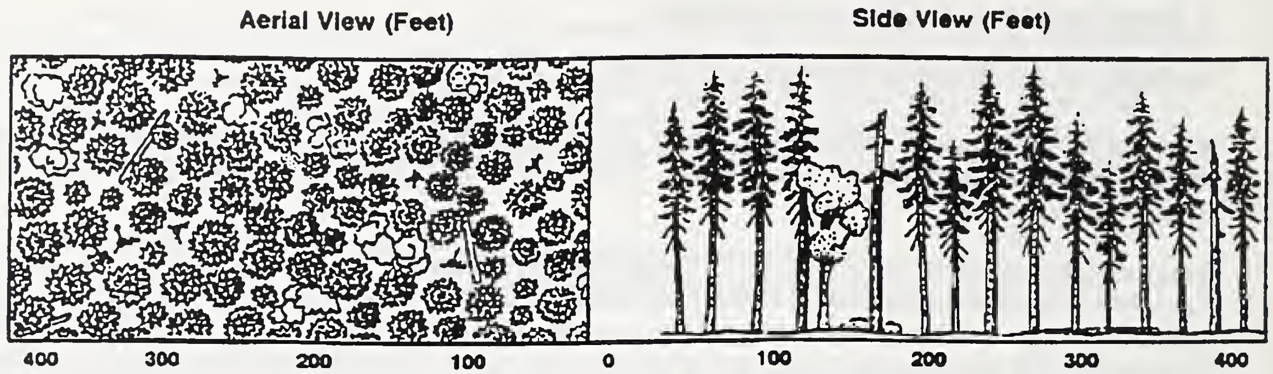
The individual tree selection method does not change the successional stage of the stand, but may more quickly bring the stand to a climax condition by favoring tolerant tree species. Because the openings created by cutting scattered individual trees are small and shaded, reproduction is limited to the shade tolerant species. If this type of harvest is applied to stands that contain intolerants, the species composition of the stand would gradually change as the intolerants are removed and replaced by more tolerant species. True individual tree selection cutting would eventually produce stands dominated by the most tolerant species that are capable of growing on the site.

Individual tree selection cuttings are not practical where dwarf mistletoe infestations occur. In stands comprised of susceptible trees of different sizes, the crowns of smaller trees are continually exposed to dwarf mistletoe seeds from larger trees. Under these circumstances, the upper crowns of understory trees can rarely remain free of increasing mistletoe infection. Reductions in tree growth and eventual mortality are almost certain. The impact of mistletoe in such stands can render them virtually non-productive (USDA 1978).

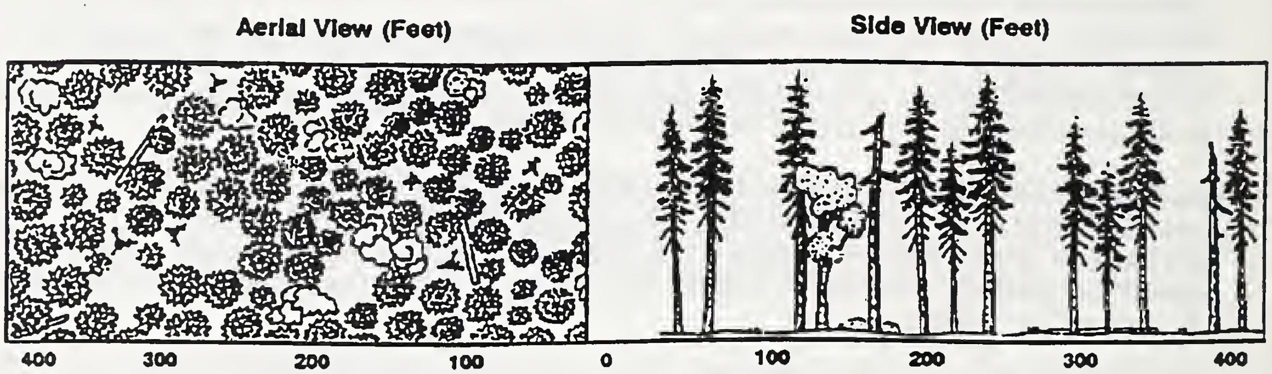
Insects, such as western spruce budworm, and Douglas-fir tussock moth, present similar problems as they feed on more tolerant tree species and thrive in multi-layer stands. This Forest has a history of spruce budworm outbreaks that have been made worse as fire suppression has allowed the stands to move toward more climax conditions.

Currently the Forest does not use true single tree selection where timber yield is an objective. Individual trees are occasionally removed from campgrounds or riparian areas, but not for sustained timber production purposes. Uneven-aged management using the single tree selection system is limited to stands where climax tree species are desired. Riparian areas and some wildlife situations may eventually be managed using this system.

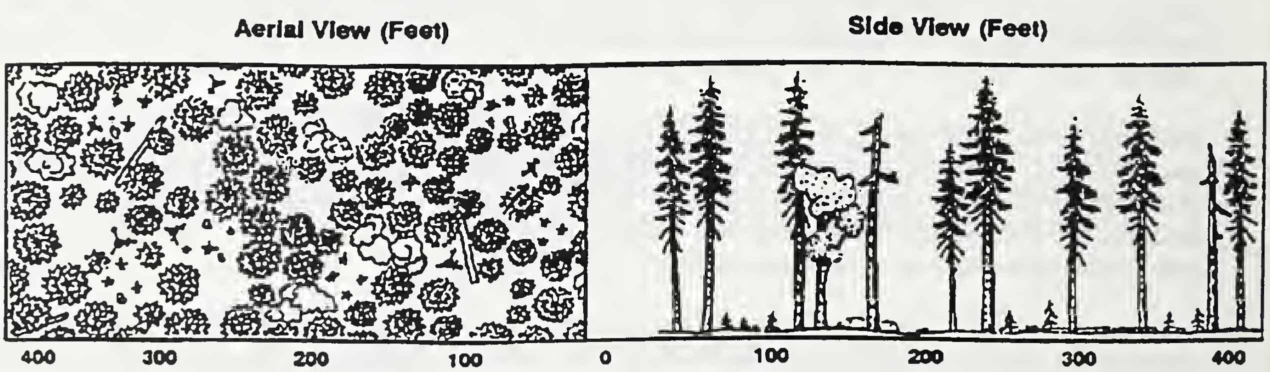
Figure G-4. Individual Tree Selection System



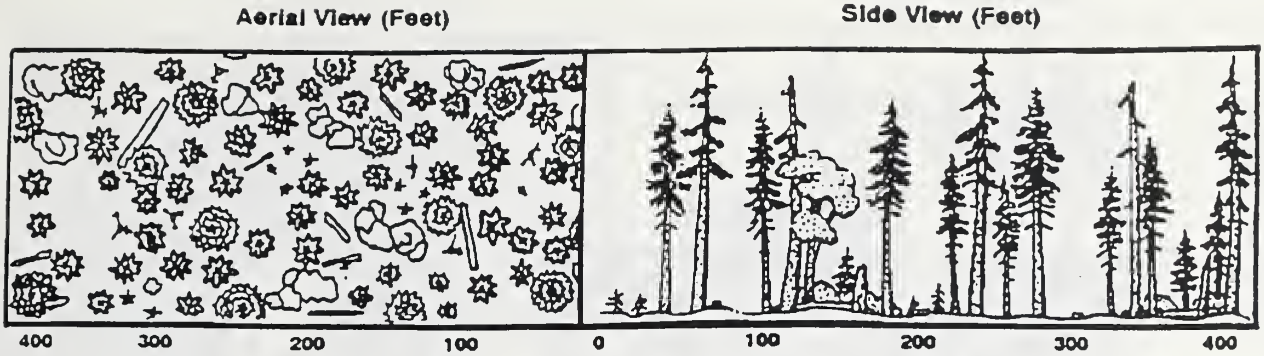
This stand is even-aged and mature to overmature. Many trees are growing slowly and there is some mortality. The dying and dead trees create small openings in the canopy which promote the growth of some understory brush and tolerant tree seedlings.



After the harvest, very small openings have been created by the removal of individual trees. Most of the stand remains unchanged.



In twenty to thirty years another harvest has taken place. Shade tolerant seedlings are growing in some of the small openings. Slow growth and mortality in the stand is still taking place as the original trees continue to age.



After one hundred years most of the original stand has been harvested. The stand is still composed of mostly shade tolerant species. Slash has increased because treatment using prescribed fire is often unfeasible due to the potential damage to the remaining stand.

2. Group Selection Prescription

See Figure G-5 for an illustration of the group selection system.

Group selection cutting involves the periodic removal of trees in much the same manner as individual tree selection, except that trees are cut in groups of from two to many trees. The group selection method creates openings from 1/10 to 2 acres in size and may create enough light and growing space to obtain regeneration of the more shade-intolerant tree species. In mixed conifer stands to be managed for timber production, openings should be at least as large as the height of the surrounding stand in order to allow desired tree species to grow. Openings will often be 1/2 to 2 acres. In group selection cutting, trees are still examined and marked individually, but the characteristics of the group as a whole are evaluated as well.

Group selection allows more light and moisture into the openings than does single tree selection cutting. The proportion of shade intolerant species can be increased, which is a primary reason to use group selection instead of single-tree selection cutting. It is more adaptable than individual tree selection to the variety of conditions and species represented in most mixed conifer stands.

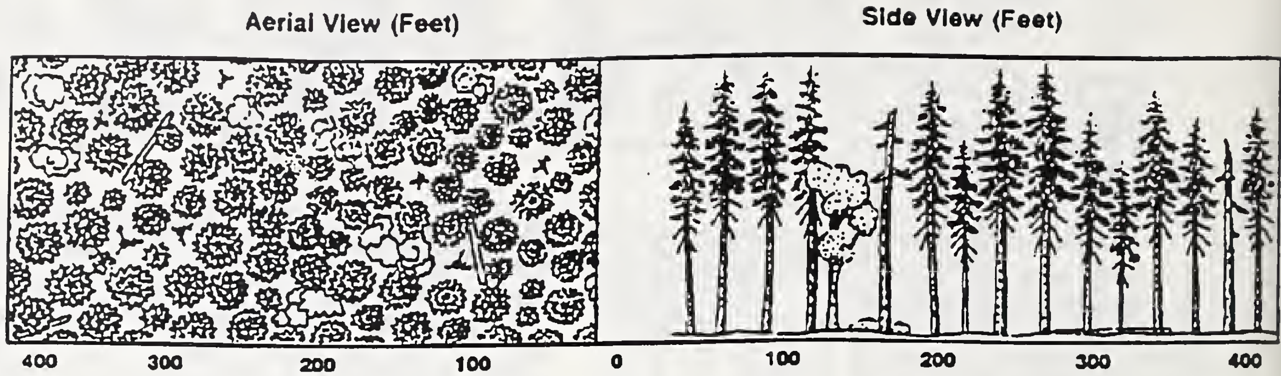
While group selection has many benefits, it is also the most difficult and expensive silvicultural system to manage properly. It requires an excellent recordkeeping system, frequent and extensive inventories, and well trained, experienced personnel to lay out and administer the sales. Frequent checks during marking are even more important under group selection cutting than single-tree selection cutting to insure that the desired residual stand goals are actually being achieved.

Group selection cutting can be nearly as suitable as single-tree selection cutting for aesthetic purposes so long as the openings are kept quite small, perhaps a quarter-acre or less. Slightly larger openings are more desirable for regenerating ponderosa pine or western larch, which are very intolerant of shade.

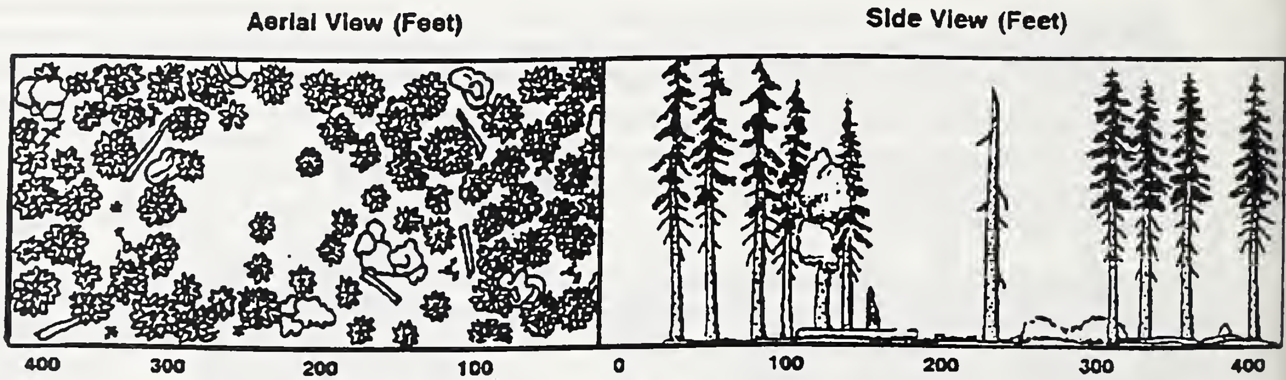
Small dwarf mistletoe infection centers may be controlled through group selection harvests. Infections that occur throughout the stand, however, cannot be controlled and would likely spread to new regeneration in the small openings. The risk from most insects and disease would decline as each harvest reduces competition between trees, and healthy, younger trees become more common.

The Forest does not currently use group selection harvests to manage stands for timber production. The additional costs, reduced yields, and increased time needed to administer this system have not compared favorably with even-aged systems. With increased public pressure to reduce clearcutting, this system may gain favor if increased costs and decreased returns to the Treasury are acceptable.

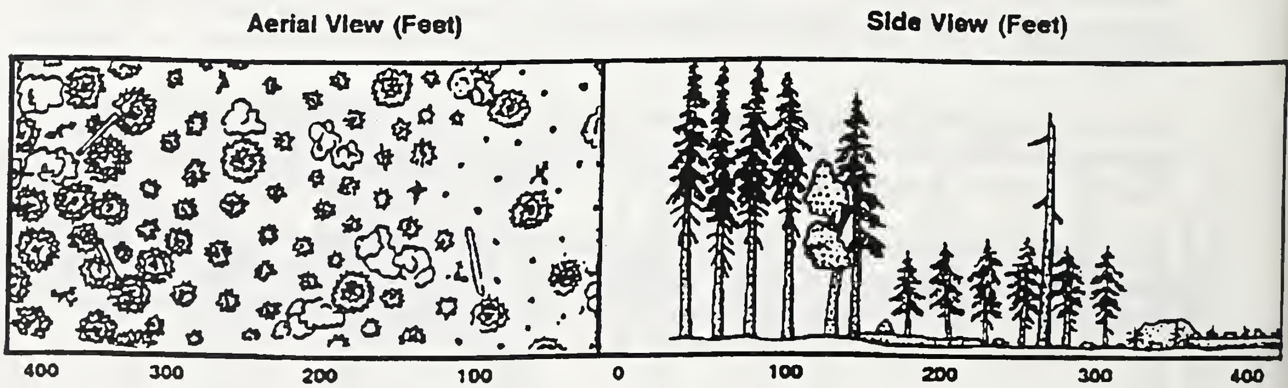
Figure G-5. Group Selection System



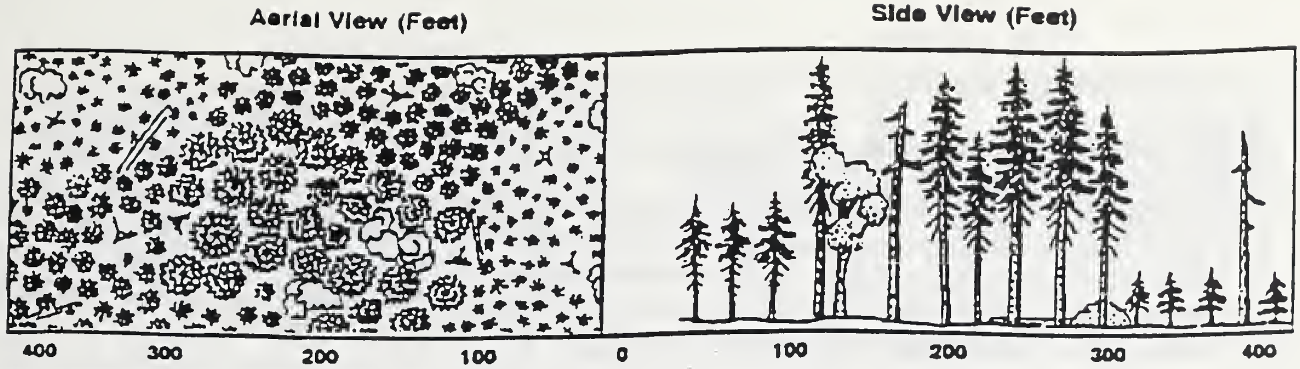
This stand is even-aged and mature to overmature. Many trees are growing slowly and there is some mortality. The dying and dead trees create small openings in the canopy which promote the growth of some understory brush and tolerant tree seedlings.



Patches (less than 2 acres in size) of mature and overmature trees have been harvested. Many older trees as well as any poles, seedlings, and saplings are retained. At the same time, patches of overstocked trees of any size are thinned to improve the health and vigor of the stand.



Twenty to thirty years after the initial harvest, another harvest has taken place. The openings created 20 years ago have filled in with new trees that are now sapling sized. The new harvest will remove additional small groups of merchantable trees and the cycle will continue.



After one hundred years, most of the original stand has been harvested. The stand is now composed of groups of trees of various ages, sizes and species

C. TIMBER STAND IMPROVEMENT PRACTICES

This section summarizes several silvicultural practices used on the Forest to establish, improve, and maintain healthy stands of timber. Most of these practices can be used either in even-aged or uneven-aged management.

1. Planting and Natural Regeneration

The National Forest Management Act requires that harvested areas be reforested within five years of final cutting. Natural regeneration often occurs at irregular intervals, with good seed crops sometimes coming more than five years apart. In order to meet the law, obtain the desired tree spacing, and to select the species composition, the Payette Forest plants seedlings on most of the harvested acres. Planting, if properly done, often creates stands that can be managed more efficiently and yield greater volumes and values than naturally regenerated stands. Major disadvantages of planting are: 1) the relatively high initial cost and long time until a return on the investment, 2) the possibility of making mistakes in matching proper **planting stock** (seedlings) to the environment, 3) potential damage and deformation of the stock during handling and planting, and 4) loss of the investment if the plantation fails.

The significant advantages include: 1) close control over the arrangement, composition and genetic qualities of the new stand, 2) avoiding the delay in establishment of regeneration that often results from natural reseeding, 3) avoiding dangers to seed and very young seedlings, and 4) freedom from restrictions on harvesting techniques needed to supply natural seed.

Assuming that the existing tree species, age, and condition are suitable for adequate seed production, natural reproduction is generally cheaper than planting. The stand finally produced from natural seeding may or may not compare favorably in composition or density to one created by planting. Later thinnings may be needed in some areas, while in others, gaps in reproduction would result in lower future growth. Generally there are increased costs of logging to retain and protect residual seed trees and for site preparation. In some cases these costs may be more than for planting (Smith 1962).

2. Precommercial Thinning

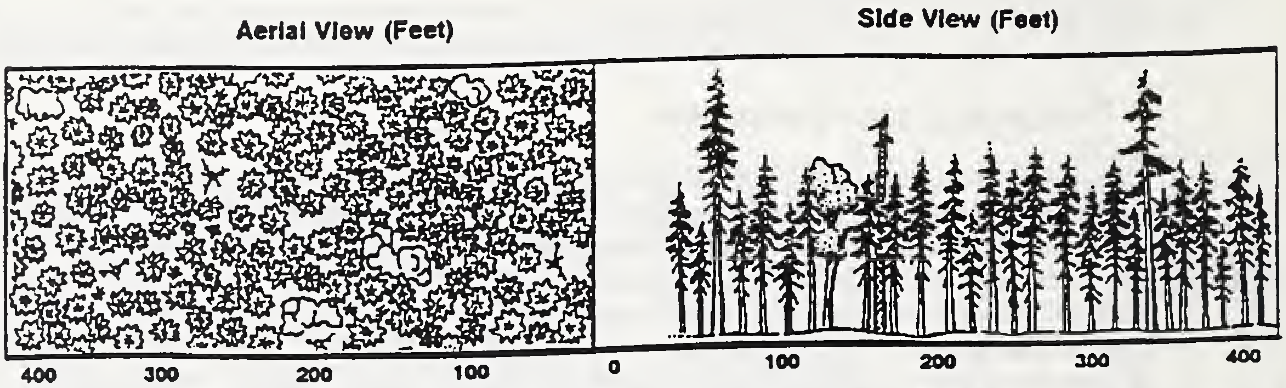
Precommercial thinning is a cutting made in an overstocked immature stand primarily to increase diameter growth on the remaining crop trees (leave trees). Water, light, and nutrients can all be limiting factors for growth in mixed conifer stands. Thinning makes more of each factor available to the remaining trees (Burns 1989). Precommercial thinning generally does not produce merchantable material. The whole tree including the main stem usually remains as slash. In addition to regulating spacing, the variety of tree species may be regulated by selecting for or against certain species. Immediately after thinning, the area may appear unnatural because of the tree spacing, slash, and small stumps. Within a few years, however, the tree crowns fill in and the slash and stumps darken and decompose leaving the area natural appearing to the casual observer. Precommercial thinnings can be used in either even-aged or uneven-aged management.

3. Commercial Thinning

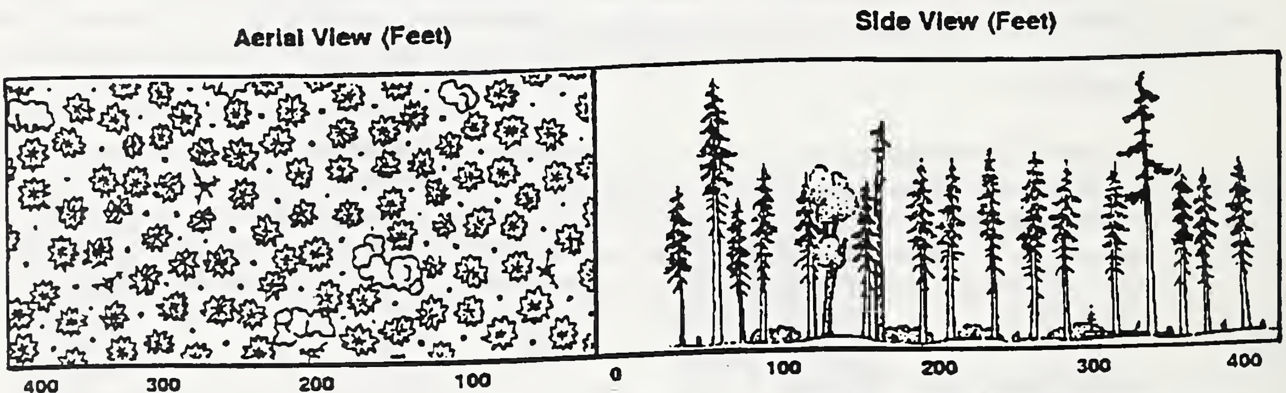
See Figure G-6 for an illustration of commercial thinning.

Commercial thinning is the harvesting of immature but merchantable trees, to increase growth in the remaining crop trees. It differs from precommercial thinning in that it produces a merchantable product. This harvest removes excess trees and leaves the most desirable, vigorous trees to grow to maturity. Thinnings are an excellent way to increase the resistance of stands to insect attack and may reduce the impacts of dwarf mistletoe. At the same time, stand composition can be regulated to maintain tree species diversity.

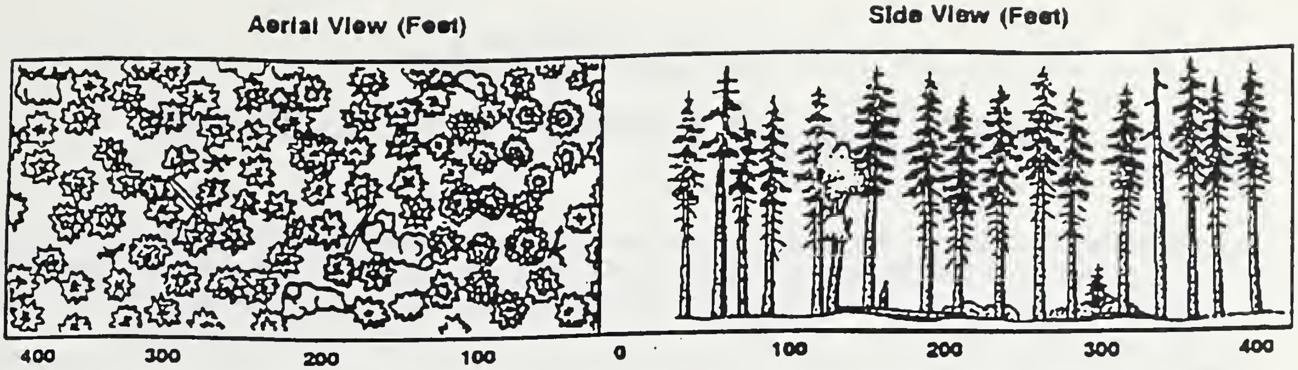
Commercial thinning is not a regeneration cut but is used to improve the stand density and species composition. Although the term "commercial thinning" applies to even-aged management, each entry for uneven-aged management also involves the removal of excess immature trees.



This is a densely stocked, immature conifer stand between 50 and 80 years old. The stand canopy is mostly closed. There may be some scattered openings and a few remnant old-growth trees.



Commercial thinning has removed poorly growing and less desirable trees. This opens the canopy and provides more growing space for the remaining trees. Scattered remnent old-growth trees and snags are intentionally left to provide wildlife habitat.



Twenty to forty years after commercial thinning, the stand canopy has again closed. Individual tree growth is beginning to decline due to overcrowding. The increased shading reduces understory growth. This stand is ready for harvest.

4. Sanitation/Salvage Harvest

This prescription removes trees that are dead, damaged, infested, or susceptible to insects and disease. Sanitation/ salvage harvests allow commercial utilization of dead and dying trees and attempt to maintain the stand in a healthy condition. Such entries are often done in stands to treat insect and disease infestations. Sanitation or salvage harvests often remove individually selected trees and is sometimes confused by the public with uneven-aged management. However, in this type of harvest there is no attempt to obtain regeneration or control growth, stocking, or yield. This harvest may be used in either even-aged or uneven-aged management.

APPENDIX H
BEST MANAGEMENT PRACTICES

This appendix lists the Best Management Practices (BMPs) for control of water quality impacts in the Hazard Helicopter timber sale. For more detailed descriptions of the following practices, refer to the Soil and Water Conservation Practices (SWCP) Handbook (Forest Service Handbook 2509.22) under the practice number listed below. The BMP descriptions represent the intent of the practice. Acutal implementation may vary from the descriptions here. The Forest Service contract clause numbers represent the most current number system at the time this chart was assembled. Minor changes to the clause numbers may have occurred since then.

BMP DESCRIPTION	CROSS REFERENCE		
	ID Forest Practices Act Regulation	SWCP Hdbk FSH 2509.22	Forest Service Contract Clause
Prevent oil spills. Prevent oil products from reaching stream or other water.		11.11	C6.341
Use sale area maps for designation of soil and water protection needs.		14.03	B1.1, B6.5, B6.6, C6.51
Riparian area designation and prescription	20.15.01.s. bbb.i. to iv.	14.06	C5.421
Limit operating period of timber sale activities.		14.04	B6.3, B6.31, B6.65 B6.6, C6.3
Protect stream channels.	20.15.03.f. and g.	14.17	B6.5, B6.6, C6.6
Retain all trees anchoring streambanks. (Forest Plan standard and guideline)			
Prevent erosion and use control measures during timber sale operations.	20.15.03.e.	14.12	B4.225, C6.3, C6.312, C6.6, C6.601
Prevent and control log landing erosion.	20.15.03.3.i.	14.11	B6.6, B6.63, B6.422, C6.4, C6.6, C6.601
Harvest no trees within a minimum of 100 feet of perennial streams or the riparian area, whichever is wider.	Site-specific BMP		
Maintain sediment buffer qualities of stream protection zones by maintaining good density of vegetation and down woody debris.	Site-specific BMP		
Promptly install backup road cross-ditching at the beginningof any period of one month or more of suspended use and prior to seasonal shutdown.	Site-specific BMP		

BMP DESCRIPTION	CROSS REFERENCE		
	ID Forest Practices Act Regulation	SWCP Hdbk FSH 2509.22	Forest Service Contract Clause
Apply an appropriate seed mixture and a soil-protecting mulch or netting on road fills and disturbed areas adjacent to drainageways or where sediment buffering is inadequate. Apply within two weeks of completion of earth work on each road section.	20.15.04.c.x., c.iii	15.06 15.04	B6.31, B6.6, C6.3, C6.36, C6.6, C6.601, B6.62, B6.65, B6.66, C5.2, C5.23, C5.4, C5.441, C5.46, C6.622, C6.52
Design road surface to be outsloped on normal sideslope sections with good sediment buffering. Design dips or rolls at maximum spacing of 500 feet.	20.15.04.c.ix	15.07	B6.6, B6.66, C6.3, C6.6 C6.601
Install sediment traps or slash filter windrows below roads or road runoff exit points where sediment buffering to drainageways is inadequate. Install within 2 weeks of completion of earth work on each road section.	20.15.04.c.v.	15.03	
Locate dips or rolls-in-grade at well-buffered locations as close upgrade of drainageways as possible.	Site-specific BMP		
Maintain road drainage during use periods.	20.15.4.d.iii.a		
Treat roads to be closed by scarifying compacted areas, seeding, and cross-	Site-specific BMP		

SITE-SPECIFIC BEST MANAGEMENT PRACTICES (SSBMPs)

On June 6, 1991 the Director of Idaho Department of Lands approved a final report from the Local Working Committee assigning water quality objectives for the Hazard and Hard Creek drainages. These objectives state: "Maintain the beneficial uses at existing levels and improve certain portions of the drainage where land use activities may be impacting water quality." A copy of this report is contained in the planning records.

With the implementation of any action alternative, the Forest intends to complete the following mitigations.

ROAD RECONSTRUCTION SSBMPS

Action alternatives propose between 1.2 to 6.5 miles of reconstruction. Most of this would occur off-Forest. Areas of concern have been identified; all are off-Forest and involve chronic cut-bank sloughing, unstable fill slopes, and inadequate drainage. The first area of concern accesses Forest Road #250. It involves cut-bank sloughing, unstable fill, and a blocked culvert. The second area is located along Hazard Creek and accesses Trail #317. It involves cut-bank sloughing and unstable fill. Road reconstruction for these roads would include: cut-bank stabilization, placement of adequate functional drainage structures, fill stabilization, and gravelling.

The third area of concern involves the Grass Mountain Road--a steep, switchback private road that accesses Trail #163. The concern centers around some surface erosion and minor fill slope instabilities. Reconstruction would include: spot gravelling the first 100 feet of road, construction of adequate drainage structures, and fill slope stablization. This road is currently closed and would be closed again after completion of the sale. Closure would include either tank trap or gating of road, adequate drainage structures for closure, and seeding and fertilization of road surface.

STREAM BUFFER SSBMPs

All buffers are no-cut zones.

- 300-foot buffer slope distance on each side of Hard and Hazard Creek, or riparian area, whichever is wider.
- 100-foot buffer slope distance on each side of all other perennial streams, or riparian area, whichever is wider.
- Minimum 25-foot buffer slope distance on each side of all intermittent streams, or riparian area, whichever is wider.
- 50-foot buffer slope distance on each side of all intermittent streams that have harvest units seperated by the stream, or riparian area, whichever is wider.

APPENDIX I
FUEL TREATMENTS

This appendix describes the slash and natural fuel-reduction treatments considered in this EIS, including the major advantages and disadvantages associated with each. This appendix does not cover all possible fuel treatments, just the more common treatments used on the Payette Forest, as well as some that are being looked at for future use. Technical terms used in this appendix are defined in the Glossary, Appendix C.

The treatments proposed in this EIS are estimates of methods and acres that are likely to be implemented. The actual treatments selected for the area will be determined by the Prescribed Burn Plan prepared after the sale is marked on the ground. The Burn Plan is often modified after harvest to reflect the actual fuel conditions. The following is a list of fuel treatments likely to be considered.

PRE-SALE BURN

This prescribed burn takes place before the timber sale is harvested. It is used to reduce the natural fuels in the area before harvest-related slash is added to the site. Another burn after the sale may or may not be needed to treat harvest slash.

Advantages - Fire can be applied at the lightest possible fuel loading on the site. Thus, fire intensities will be as low as possible, given conditions at the time of ignition. Risk of damage to snags, desirable vegetation, and soil is lower than if accumulated fuels are burned after harvest. If large areas are burned, costs per acre can be quite low. Tress damaged by burning may be designated for harvest or as leave snags, depending on objectives.

Disadvantages - Brush Disposal (BD) funds collected during a sale are not available before harvest. Other funding is often unavailable to pre-treat a future harvest area. Access may be limited and control lines such as roads and skidtrails are often not in place before the sale. Burning may damage some of the timber designated for harvest.

LOP AND SCATTER

This treatment requires that unused portions of trees (i.e., limbs and tops) be cut into pieces and scattered so that the needles, twigs, and branches lie within two feet of the ground. This treatment allows winter snow to push the fuel closer to the soil, speeding the decomposition process. The reduction of aerial fuel lowers the flammability of the slash and can reduce the rate of spread of potential wildfires.

Advantages - The costs of this treatment are quite low. Organic material is left on site, enhancing future soil productivity as the fuel decomposes. The fuels intercept precipitation, slowing surface runoff and reducing erosion. There is no risk of an escaped burn. The slash provides habitat for small mammals and invertebrates.

Disadvantages - The harvest-related slash is added to the existing natural fuel, often creating a high risk of intense wildfire. If a wildfire does occur, the combined fuels may destroy the remaining stand and investments in timber stand improvement. The risk of bark beetle outbreaks increases. Large slash accumulations can impede wildlife movement and habitat use.

BROADCAST BURN

This fuel treatment allows fire to burn over a designated area. For fuels in a harvest unit, the fire is often confined within the unit boundary. The intensity of the fire and the amount of fuel consumed depends upon the conditions at the time of ignition. The objectives of the burn and the conditions under which it will occur are described in the Burn Plan. In addition to the typical broadcast burn that might be prescribed in a clearcut, underburns may be done in stands where live trees are retained for the future.

Advantages - This burn treats the fuels where they occur. It more closely resembles a natural fire than any of the other post-sale treatment methods, particularly when the burning is done underneath standing leave trees. Nutrients released by the fire are available for plant growth over a large area of ground. Burning under moist conditions can produce a patchy burn that reduces fine fuels while leaving some of the duff and large woody material for soil protection. Large acreages can be treated relatively rapidly. This burn can be used on areas where slopes are too steep or soils are too wet for mechanical treatments. Forage for big game and many other herbivore species is usually improved.

Disadvantages - Costs can increase as people and equipment are needed to construct control lines and hold the fire within prescribed boundaries. Depending on the burn intensity, down logs and shaded microsites may be reduced, and it may be difficult to retain live trees and snags. The removal of too much organic matter could expose mineral soil to erosion. The time in which burning conditions meet the requirements for a successful treatment may be short, limiting the amount of burning that may be accomplished (the burning window). Climax plant species are often killed and may not return for decades.

JACKPOT BURN

This treatment applies fire to relatively small concentrations of fuels that occur within the harvest unit. There is no attempt to have the fire burn throughout the unit, as in a broadcast burn. Jackpot burning is usually done under conditions where control lines are not needed. It is often done in the Fall just prior to predicted precipitation, and thus the fire burns concentrated fuels and creeps through lighter fuels until extinguished by rain or snow.

Advantages - Fuels are burned where they occur. Only unacceptable fuel concentrations are ignited. Costs are generally low for ignition and monitoring. This is often the only economical method to treat fuels where large numbers of live trees are left after logging. Burning can be done on steep slopes where the entire unit is not planned for fuel reduction. Vegetation may benefit from nutrients released in localized areas.

Disadvantages - The burning window is often very short. Ignition is usually by hand and proceeds relatively slowly. Weather changes may require extensive mop-up and patrolling. This type of burn has one of the highest risks of escaping from a designated area. Live trees and snags may be damaged by the burn.

TRACTOR PILE AND BURN

This treatment usually uses crawler or rubber-tired tractors with toothed (slash) blades to push fuels into piles for burning. The tractor operator can select the types of fuel for piling and leave some of the large woody material for soil productivity.

Advantages - The location and size of the pile can be controlled. The fuel can be moved to openings and away from live trees and snags. The size and arrangement of the pile determines the intensity of the burn. Piles can be burned when it is too wet for broadcast burning. This is one of the easiest types of burn to ignite and control. Many fire-sensitive plant species can be retained in the harvest unit.

Disadvantages - The piling operation can cause soil displacement and compaction. Care must be taken to avoid moving soil into the piles. Surface disturbance may encourage noxious weed establishment. There is increased potential of damage to residual live trees due to the movement of the tractor and the pushed slash. Piled slash concentrates heat in a localized area and may cause severely burned soils that reduce site productivity and retard regeneration. Nutrients released during burning are not spread over the entire area. Early seral plant species that require heat for regeneration will not be abundant.

HAND PILE AND BURN

This method used hand labor to pile the slash. Piles are usually much smaller than in tractor piling. Generally only lighter fuels are piled and burned. This type of treatment is usually limited to partial cut areas where no other treatment method will work, or visually sensitive areas such as recreation sites, or for protection around improvements.

Advantages - This treatment creates virtually no soil disturbance. Because the piles are small, burn intensity is low. Nutrient releases may benefit vegetation in localized areas. The large woody material is left on site for long-term nutrient cycling. There is no potential to damage live trees when piling. Some small piles can be left unburned for wildlife habitat enhancement.

Disadvantages - The cost for labor is very high. The amount of fuels piled is relatively low. The acres treated is also limited by the manpower available. Piles may not be placed far enough away from live trees to prevent scorch.

YUM PILE AND BURN

YUM stands for Yard Unmerchantable Material. This means that limbs, tops, and unmerchantable logs are brought from the harvest unit to the landing for piling and burning. The yarding method is the same as used to log the unit (i.e., tractor, skyline, or helicopter). The YUM pile at the landing can become very large.

Advantages - This method protects the remaining live trees and snags by eliminating prescribed fire from the harvest unit. Timely burning also reduces the risk of wildfire and beetle outbreaks. Burning can be done safely, even with snow on the ground, eliminating the risk of escaped fire. This system can make significant amounts of firewood available to the public.

Disadvantages - The size of YUM piles is often very large. Burning generates intense heat that could seriously reduce soil productivity under the pile and may scorch surrounding trees. Much of the woody material is removed from the harvest unit, reducing the material available for soil benefits and wildlife habitat improvement. Costs are very high, especially if helicopter yarding is used. Landings also must be enlarged to accommodate the piled material. Early seral plant species that require heat for regeneration will not be abundant.

GRAPPLE PILE AND BURN

This method of treatment is similar to tractor pile and burn except for the type of equipment used for piling. Instead of pushing slash into piles, a long arm with a grapple attachment reaches out to pick up slash and place it into a pile for later burning. The type of carrier varies by manufacturer. Some are track-mounted (i.e., Trackhoe), while others move on rubber tires or walk over the ground (Spyder).

Advantages - Soil disturbance and compaction are often much less than with traditional tractor piling. Slash is retained on site, and pile size can be adjusted to meet the needs of the area. Slash can be piled on steep slopes using some of the equipment. Slash can be moved away from live trees and snags. Only the desired slash needs to be piled. Large woody material can be left on site.

Disadvantages - Costs for this new equipment can be very high. The availability of some of the equipment is limited.

APPENDIX J
ECONOMIC ANALYSIS

MTVEST (INVESTMENT ANALYSIS PROGRAM FOR RESOURCE PLANNING AND PROJECT ANALYSIS)

The purpose of the MTVEST program is to assist in the selection of higher economically valued investments from a proposed number of projects or alternatives. A particularly important feature of the program is its ability to include impacts and trade-offs that would occur with a given project or alternative and reflect these as an opportunity cost. For instance, the recreational benefits that will be negatively impacted by a project must be considered as a cost. Hopefully, a newly created benefit will offset this cost, but the point is that all costs and benefits, both direct and indirect, must be considered to make any analysis meaningful.

The computer program was developed by Hans R. Zuuring, station biometrician, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana; and by Ervin G. Schuster, project leader, USDA Forest Service, Intermountain Forest and Range Experiment Station, Missoula, Montana.

MTVEST is an investment analysis program that uses discounting formulas that compute present net values and internal rate-of-return for each project alternative. The user specifies the costs involved, the value of the benefits (income) to be derived, and the time schedule for each of these elements. The program discounts all costs from the beginning of the year or period and all incomes from the end of the year or period. Discounting is a technique for converting costs and income that will occur over a period of time to an equivalent value at a common point in time. Money has a time value. A dollar received today is worth more than a dollar that will be received in five years. Likewise, a cost incurred today has more value than a cost that does not have to be paid for several years.

The benefit cost ratio, present net value and annual equivalent value of the present net value are calculated for four levels - Office of Management and Budget rate (7.13 percent) ranking rate (4.00 percent), and optional rates of 6.0, and 10.0 percent to be specified by the user. The internal rate-of-return is calculated through an iterative process starting at 0 percent and continuing in increments of 1 percent up to a maximum of 100 percent.

The program also calculates and displays the discounted cost of each cost item and the discounted income for each income item at the specified ranking rate. This is done for two purposes: (1) to determine which cost or income item is the most sensitive to discounting, and (2) to determine the optimum scale of development of a given project.

Projects/alternatives are ranked both by their benefit cost ratios and their present net values. The computer printout for each ranking shows the present net value at the ranking percent, the internal rate of return, the non-discounted costs for the first five years (by year), and the accumulated first-year cost for projects or alternatives.

In the Forest Service, ranking by present net value is the most commonly used measure of economic efficiency. If projects or alternatives are mutually exclusive and only one can be chosen, then present net value is the appropriate choice for the goal of economic efficiency. Ranking by any of the measures of economic efficiency should be used with some caution unless the evaluator is experienced in economics because any of the measures can give erroneous answers in certain cases.

The program will handle up to 150 separate cost and income items. Options are provided for five types of costs or incomes:

(1) a single payment,
(2) a series of equal annual payments,
(3) a series of constantly-increasing annual payments,
(4) a series of constantly decreasing annual payments,
(5) a series of opportunity costs.

Periods of up to 200 years, costs of up to $100 million can be used in the program.

The actual MTVEST analysis program results, by alternative, are located in the Hazard Helicopter timber sale planning records, Supervisor's Office, McCall.

RESOURCE-RELATED JOBS AND INCOME

The following tables display resource-related employment and income for the West-Central Highlands communities in 1987.

Table J-1. Employment and Income Linked to Timber

	EMPLOYMENT			INCOME		
Community	Baseline Employment	Timber Linked	Percent Linked	Baseline Income	Timber Linked	Percent Linked
	---------(Jobs)---			---(Thousands of Dollars)---		
Cambridge	198	37	18.7	10,194	2,336	22.9
Cascade	507	211	43.7	20,497	9,658	47.1
Council	608	273	44.8	20,432	8,527	41.7
Emmett	2,485	1,172	47.2	97,969	48,197	49.2
Garden Valley	152	28	18.2	3,711	1,074	28.9
Horseshoe Bend	263	230	87.4	11,331	10,099	89.1
McCall	1,860	210	11.3	72,958	11,595	15.9
Midvale	85	17	19.5	3,404	583	17.1
New Meadows	362	207	57.1	11,566	7,129	61.6
Payette/Ontario/Weiser	6,532	17	0.3	282,315	623	0.2
Riggins	334	25	7.6	32,927	3,568	10.8
TOTAL	13,387	2,437	18.2	567,304	103,386	18.2

Table J-2. Employment and Income Linked to Recreation

	EMPLOYMENT			INCOME		
Community	Baseline Employment	Recreation Linked	Percent Linked	Baseline Income	Recreation Linked	Percent Linked
	---------(Jobs)---			---(Thousands of Dollars)---		
Cambridge	198	28	14.2	10,194	640	6.3
Cascade	507	93	18.4	20,497	2,380	11.6
Council	608	44	7.3	20,432	1.077	5.3
Emmett	2,485	102	4.1	97,969	2,961	3.0
Garden Valley	152	23	15.2	3,711	426	11.4
Horseshoe Bend	263	5	1.9	11,331	83	0.7
McCall	1,860	624	33.5	72,958	17,789	24.4
Midvale	85	4	4.8	3,404	73	2.1
New Meadows	362	55	15.2	11,566	1,145	9.9
Payette/Ontario/Weiser	6,532	99	1.5	282,315	2,634	0.9
Riggins	334	138	41.2	32,927	6,609	20.1
TOTAL	13,387	1,215	9.1	567,304	35,816	6.3

Table J-3. Employment and Income Linked to Agriculture

Community	EMPLOYMENT Baseline Employment	Agriculture Linked	Percent Linked	INCOME Baseline Income	Agriculture Linked	Percent Linked
	---------(Jobs)---------			(Thousands of Dollars)		
Cambridge	198	55	27.8	10,194	2,807	27.5
Cascade	507	8	1.5	20,497	394	1.9
Council	608	74	12.1	20,432	3,424	16.8
Emmett	2,485	280	11.3	97,969	14,136	14.4
Garden Valley	152	11	7.2	3,711	420	11.3
Horseshoe Bend	263	7	2.7	11,331	435	3.8
McCall	1,860	19	1.0	72,958	1,031	1.4
Midvale	85	48	55.8	3,404	2,186	64.2
New Meadows	362	14	3.8	11,566	714	6.2
Payette/Ontario/Weiser	6,532	1,560	23.9	282,315	79,532	28.2
Riggins	334	52	15.5	32,927	9,219	28.0
TOTAL	13,387	2,126	15.9	567,304	114,298	20.2

HAZARD HELICOPTER TIMBER SALE
DRAFT ENVIRONMENTAL IMPACT STATEMENT

New Meadows Ranger District
Payette National Forest
Idaho County, Idaho

November 1993

Lead Agency:	USDA Forest Service
Responsible Official:	David Alexander Forest Supervisor Payette National Forest PO Box 1026 McCall, Idaho 83638
For Further Information, Contact:	Mike Balboni Roadless Area EIS Team (208) 634-0629

Abstract: This draft environmental impact statement (EIS) documents the analysis of four alternatives--including the No Action alternative--that were developed for the proposed Hazard Helicopter timber sale on the New Meadows Ranger District of the Payette National Forest. The alternatives respond differently to the major issues and resources that were identified for this project. The action alternatives would treat between 205 and 836 acres of timber using the helicopter logging system. Harvest emphasis would be on dead, dying, and high-risk trees to improve the health and vigor of timber stands in the area.

Part of the sale planning area lies within a proposed wilderness area in the LaRocco wilderness bill (H.R. 1570), and almost all of the planning area lies within the French Creek/Patrick Butte Roadless Area. No new roads would be constructed in the roadless area under any alternative. Some road reconstruction would occur outside of the roadless area in the action alternatives. This reconstruction would be designed to reduce existing sedimentation in Hard and Hazard Creeks, which have been designated Stream Segments of concern by the State of Idaho.

Reviewers should provide the Forest Service with their comments during the review period of the draft EIS. This will enable the Forest Service to analyze and respond to the comments at one time and to use comment information in the preparation of the final EIS, thus avoiding undue delay in the decision-making process. Comments should be specific and should address the adequacy of the statement and the merits of the alternatives discussed. Comments on this draft EIS should be sent to the Responsible Official at the above address by: JAN 28 1994

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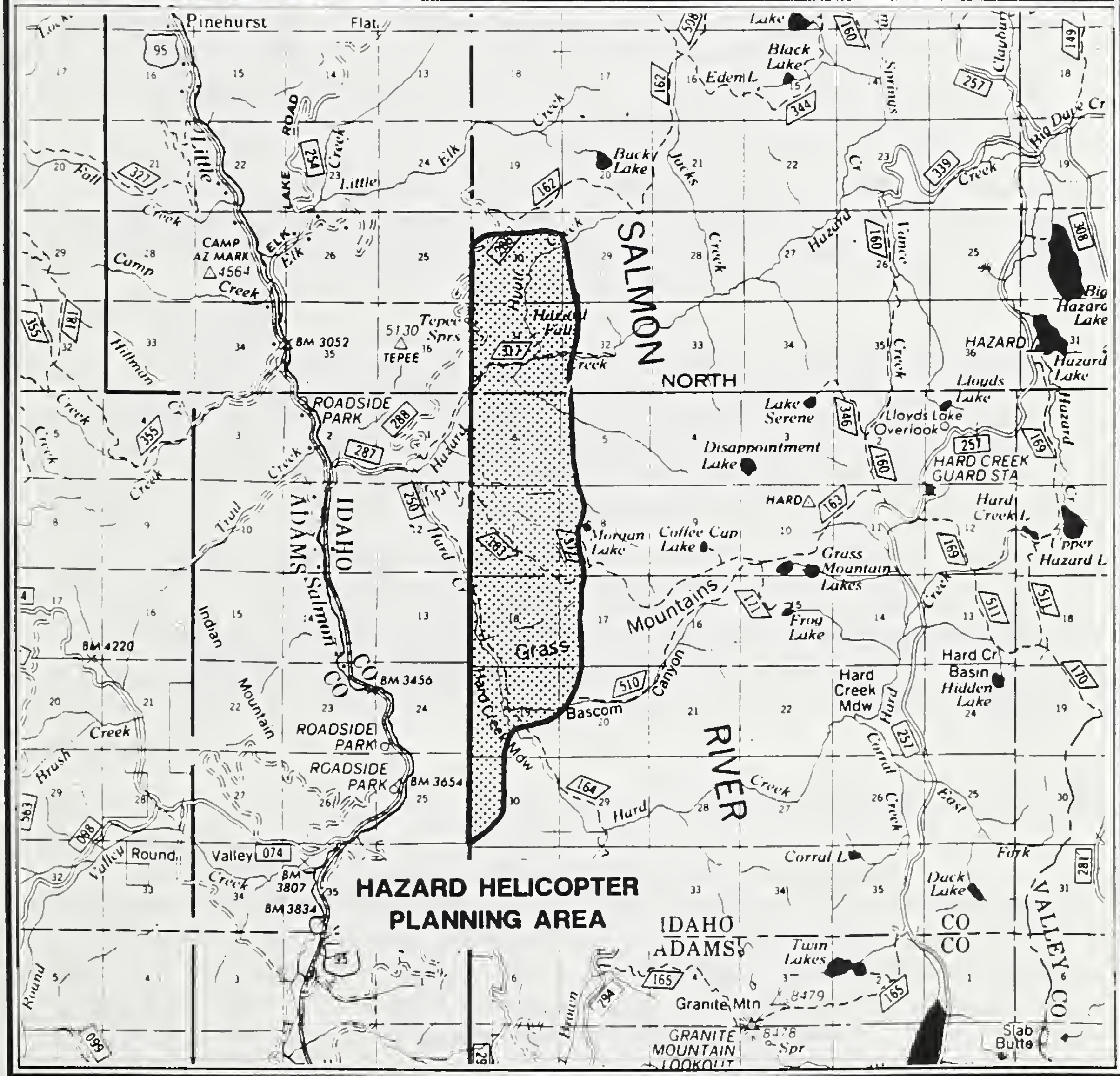
Payette National Forest

Intermountain Region
Forest Service

United States
Department of
Agriculture

Summary and Index for the Hazard Helicopter Timber Sale

DRAFT ENVIRONMENTAL IMPACT STATEMENT



Summary

THE PROPOSED ACTION

The Payette National Forest proposes to reconstruct roads and harvest timber in the Hazard Helicopter timber sale. The proposed sale planning area lies within and adjacent to the French Creek/Patrick Butte Roadless Area. This sale follows the direction in the Payette National Forest Land and Resource Management Plan (Forest Plan 1988), which guides management of the entire Forest in a prudent and comprehensive way.

PURPOSE AND NEED

The **purpose** of the Proposed Action is to improve the existing silvicultural conditions of the timber stands within the Hazard Helicopter planning area in accordance with the goals, objectives, and Desired Future Condition described in the Payette Forest Plan. The Proposed Action would increase long-term health and productivity of the timber resource, while providing short-term wood products and protecting other resource values in the planning area.

The **need** for the Proposed Action is generated by the difference between current timber stand conditions in the planning area and the Desired Future Condition for the area as stated in the timber management and harvest direction of the Forest Plan (pages IV-50 to IV-69, IV-207 to IV 208, and Appendix A, Timber Sale Activity Schedule). These conditions are:

Existing Condition - A number of mature-to-overmature mixed conifer and stands are showing signs of slow growth, disease, decay, and mortality. Shade-tolerant grand fir trees are slowly taking over the stands and crowding out other species. Some stands are currently overstocked with mature and immature trees and would benefit from commercial or precommercial thinning. Other stands are understocked, especially in their understories, and would benefit from reforestation efforts to improve stocking. Planning area timber stands are growing at 5 percent of the area's site potential.

Desired Future Condition - Forest Plan direction is to manage suited timber acres to near site potential to produce commercial crops of trees suitable for sawtimber and other wood products (Forest Plan, page IV-50). Timber management intensity will be high. The majority of the overmature stands will be converted to vigorous, young stands in the next 50 to 80 years. The Desired Future Condition for this area is to have timber growing at roughly 75 percent of site potential through harvest, reforestation, and timber stand improvement treatments.

THE PLANNING AREA

The proposed Hazard Helicopter timber sale planning area covers 4,141 acres within the Hazard and Hard Creek tributaries to the Little Salmon River drainage on the New Meadows Ranger District of the Payette National Forest. Access to the area is from the west, using existing roads. The planning area lies entirely in Idaho County, Idaho. More specifically, the planning area is located about 15 miles north of New Meadows, and a mile east of Highway 95 (see Figure 1-1 in the draft EIS and the front cover map).

ISSUES

Issues are concerns about Forest management. As part of the public involvement process that is detailed in Chapter 5 of this EIS, the Forest solicited comments on this proposal from the public through written scoping, telephone calls, and meetings. Over 150 written and oral comments were recorded and combined with concerns from Forest managers and public issues from previous planning efforts. From these comments and concerns, the Forest identified the major issues for the proposal. These issues are briefly described below, including indicators that were used to assess how the issues would be affected by the proposed alternatives.

WATER

The first issue is the effects of the proposed timber sale on water quality within the affected subwatersheds. Road reconstruction and timber harvest could accelerate surface erosion and increase stream sedimentation rates. Accelerated sedimentation of streams can degrade water quality, alter channel morphology, and adversely affect beneficial uses. The indicator for this issue is percent over natural sedimentation level, as measured by the BOISED model.

The second issue is the effects of the proposed timber sale on water yield and timing of peak runoff within the affected subwatersheds. Timber harvest and road reconstruction can increase overall water yield of a watershed and can change the timing of peak runoff of streams. These changes, in turn, can increase bank erosion, thereby destabilizing the dynamic equilibrium of the system. The amount of water yield increase is proportional to the percent of subwatershed harvested. The indicator for this issue is the percent of subwatershed harvested.

FISH HABITAT

The issue is the effects of the proposed sale on fish habitat within and downstream from the planning area. Fish habitat consists of many components, and management activities may negatively impact some or all of the habitat requirements. The indicators for this issue are: 1) percent over natural sedimentation, 2) miles of road constructed or reconstructed, 3) number of stream crossings constructed, 4) proximity to perennial waters, and 5) risk of toxic spills.

BIOLOGICAL DIVERSITY

The first issue is the effects of the proposed timber sale on old-growth habitat. Timber harvest activities can reduce the acres of forest in old-growth condition to the point that ecological function is modified. The indicator for this issue is the percent of old-growth forest within the planning area.

The second issue is the effects of the proposed timber sale on forest health at the landscape level. Large blocks of mature/old growth forest are present across the planning area and affected drainages. Populations of plants and animals associated with large blocks of interior forest in mature and old-growth stages are relatively high. Timber harvest and associated activities could create openings in large blocks of timber that may produce edge effects, indirectly reducing interior habitat for certain species of plants and animals, isolating populations and interfering with animal movements. The indicator for this issue is the amount of unfragmented forest blocks and biological corridors in the planning area.

The third issue is the effects of the proposed timber sale on special vegetation habitats in the planning area. A few special vegetation habitat types exist in the planning area that are more common in northern Idaho but rather rare on the Payette National Forest. Reductions in these special habitats could also reduce the biological diversity in the area. The indicator for this issue is the percent of these habitats disturbed in the planning area.

The fourth issue is the effects of the proposed timber sale on threatened, endangered, and sensitive (TES) plant species. The sensitive plant, puzzling halimolobus (*Halimolobus perplexa* var. *perplexa*), occurs in the planning area, and timber harvest activities have the potential to directly or indirectly affect populations of this plant and threaten its viability. The indicator for this issue is the percent of TES plant habitat disturbed in the planning area.

TIMBER

The first issue is the need to treat timber stands in order to improve health and vigor and to meet future growth and productivity projections made in the Payette Forest Plan. Timber harvest can be used to improve growth, health, and vigor. Treating suited timber stands is a basic premise in the Forest Plan for maintaining healthy stands and meeting timber production objectives. The indicators are: 1) acres treated, 2) percent of acres treated in relation to suited acres needing treatment, and 3) timber volume harvested.

The second issue is the silvicultural systems used to manage timber stands and the type of logging methods used in harvesting. Clearcutting has become a national issue to some members of the public and to the Forest Service. Recent Forest Service direction is to reduce clearcutting except where there is clear evidence that it is needed. Another public concern is the construction of roads for harvest operations. Some suggest Helicopter logging as a means to reduce road construction and its impacts on other resources. The indicators for this issue are: 1) acres by silvicultural system or cutting method, and 2) acres by logging method.

The third issue is the growth, health, and vigor of timber stands in the planning area. This issue includes the impacts from insects and disease, regeneration methods, and the salvage of dead and dying timber. Forest sites have a certain inherent ability to grow trees. Often, tree growth in timber stands is below the site's potential because the trees are crowded, old, or diseased. By harvesting trees that are no longer growing at optimum rates, growth rates can be improved in residual stands. This also improves the health and vigor of the residual stands, making them more resistant to insects and disease. The indicators for this issue are: 1) stand growth as a percent of site potential, and 2) acres by regeneration method.

WILDLIFE HABITAT

The first issue is the effects of the proposed sale on wildlife biological diversity and special wildlife habitats in the planning area. Five special wildlife habitats have been identified in the planning area. Certain wildlife species can be dependent on special habitats for their survival. A loss of these habitats may cause species to disappear from the planning area, resulting in a local loss of biological diversity. The indicators for this issue are: 1) the effects on wildlife biological diversity, and 2) the effects on special wildlife habitats in the planning area.

The second issue is the effects of the proposed sale on Management Indicator Species (MIS) habitats in and near the planning area. By monitoring MIS and their associated habitats,

Forest managers can estimate effects on all wildlife species on the Forest and develop management activities that do not conflict with wildlife management goals and objectives. The indicators for this issue are: 1) effects on Rocky Mountain elk habitat, 2) effects on pileated woodpecker habitat, 3) effects on Williamson's sapsucker habitat, and 4) effects on vesper sparrow habitat.

The third issue is the effects of the proposed sale on TES wildlife species habitats in and near the planning area. Timber harvest and associated activities can potentially destroy or degrade habitats of TES species, which could reduce populations and distribution and viability of these species. The indicators for this issue are: 1) effects on habitats of threatened and endangered wildlife species, and 2) effects on habitats of sensitive wildlife species.

RECREATION RESOURCES

The issue is the effects of the proposed sale on the recreation opportunities in the planning area and in the overall roadless area. This issue includes effects on trails and on visual quality. Timber harvest activities can modify the existing scenery as seen from trails, roads, lookouts, and other sensitive locations. The proposed activities would change the recreation setting and opportunities in the area, which would change the amount and types of recreation use. The indicators for this issue are: 1) miles of trail corridor modified, 2) acres visually affected, 3) acres not meeting visual quality objectives, 4) change in recreation opportunity spectrum acres, 5) change in recreation visitor days, and 6) change in big-game hunting opportunities.

ROADLESS CHARACTER AND WILDERNESS POTENTIAL

The issue is the effects of the proposed sale on the roadless character and wilderness potential of the French Creek/Patrick Butte Roadless Area. Most of the Hazard Helicopter planning area lies within this roadless area. The Forest Plan allocated the roadless area to primarily three prescriptions: timber management, backcountry management with limited timber harvest, and backcountry with no timber management. Nevertheless, public opinion remains divided over the allocation, and interest remains high regarding the effects of development on the roadless character and wilderness potential of the roadless area. The indicators for this issue are: 1) acres eligible for future wilderness consideration, both in the planning area and in the French Creek/Patrick Butte Roadless Area, and 2) effects on wilderness attributes, which include natural appearance, natural integrity, opportunities for solitude, opportunities for primitive recreation, and special features.

ECONOMIC, SOCIO-ECONOMIC, AND SOCIAL

The issue is the economic, socio-economic, and social effects of the timber sales. This includes the economic efficiency of each sale as measured by present net value, the effects on jobs, income, and payments to counties, and the effects on local social groups. The indicators for this issue are: 1) present net value, 2) jobs and income, 3) payments to counties, and 4) social conflict.

ROADS AND ACCESS MANAGEMENT

The issue is the amount of road reconstruction that should be done, and how road access is managed both during and after the sale. Whether specific roads are open or closed to the

public, and at what times of the year, has been of great public interest on the Payette Forest in recent years. No new roads will be constructed with this sale; however, road reconstruction and access to the area through private land are concerns and offer opportunities for future management. The indicators for this issue are: 1) miles of road reconstructed, 2) miles of road open to the public during and after the sale, and 3) number of right-of-ways to be obtained.

ALTERNATIVES CONSIDERED IN DETAIL

An Interdisciplinary (ID) Team developed and analyzed in detail four alternatives for the Hazard Helicopter timber sale. All action alternatives meet the Purpose and Need for this project, and move the planning area toward the Desired Future Condition for the area as stated in the Forest Plan. The action alternatives are presented in terms of timber sale activities, such as acres by cutting method and miles of road reconstructed. Cutting unit locations, road miles, treated acres, and timber volume are approximations based on the best available information.

ALTERNATIVE A (NO ACTION)

This alternative is the No Action theme required by the National Environmental Policy Act. Current management of the area would continue, as directed in the Forest Plan, except that the proposed timber sale (and its associated activities and mitigation measures) would not be implemented. The roadless portion of the planning area would not be developed, thus providing the opportunity to re-evaluate the area for wilderness designation in the foreseeable future. This alternative would have fewer negative impacts to the physical environment (air, soils, water) than any of the proposed action alternatives.

See Figure 2-1 in Chapter 1 for a map of the planning area with existing road locations.

ALTERNATIVE B (PROPOSED ACTION)

This alternative was developed from the 1993 Forest Seven Year Action Plan to treat suited acres through even-aged management. Prescriptions, logging methods, and road locations have been modified somewhat from the original Forest Plan Activity Schedule proposal to reflect the latest site-specific information. Other resources (fisheries, range, recreation, water, wildlife, roadless character, etcetera) would be managed at levels approximating Forest Plan direction.

Timber - Use mainly even-aged timber prescriptions to bring stands under intensive management and increase health, vigor, and productivity. Bring stand growth up to -18 percent of site potential by harvesting 7.1 million board feet from 836 suited acres using 734 acres of shelterwood 3 prescriptions and 102 acres of sanitation salvage cuts. Use helicopter logging on all 836 acres.

Fuels - Treat logging slash by Yarding Unmerchantable Material (YUM) and burning 255 acres, jackpot burning 391 acres, and by lop and scatter on 190 acres of harvest treatments.

Roads - Construct no new roads. Reconstruct 6.5 miles of existing road to access helicopter landings and haul out logs. This road work and use would require obtaining a rights-of-way from the current landowners. Following the sale, most roads would remain open to public motorized vehicle access.

Figure 2-2 in Chapter 2 shows the proposed road reconstruction, and harvest unit locations for Alternative B.

ALTERNATIVE C

This alternative treats fewer acres than the Proposed Action in order to accommodate other resources such as roadless character, old growth, fragmentation, and biological corridors. Road reconstruction and timber management would only occur in the roaded and developed portions of the planning area. Mitigation for and protection of long-term resource values would meet or exceed the Forest Plan standards and guidelines.

Timber - Manage suited timber stands outside the roadless area using even-aged prescriptions. Bring stand growth up to ~61 percent of site potential by harvesting 2.4 million board feet from 205 suited acres using 172 acres of shelterwood prescriptions, and 33 acres of clearcuts with reserve trees. Use helicopter logging on all 205 acres. Plant seedlings on 33 acres to bring some stands up to full stocking potential.

Fuels - Treat slash created during logging by broadcast burning 33 acres, lopping and scattering 105 acres, YUM pile and burning 28 acres, and jackpot burning on 39 acres.

Roads - Construct no new roads. Reconstruct 1.2 miles of existing road to access helicopter landings and haul out logs. This road work and use would require obtaining a right-of-way from the current landowners. Following the sale, this road would remain open to public motorized vehicle access.

Figure 2-3 in Chapter 2 shows the proposed road construction, reconstruction, and harvest unit locations for Alternative C.

ALTERNATIVE D

This alternative emphasizes uneven-aged management and the treatment of suited acres, while harvesting somewhat below the timber volume level listed in the Forest Seven Year Action Plan. Project design has been changed from the proposed action to address habitat and other resource concerns. Some of the concerns include opening size and location, fragmentation, visual impacts, and maintenance of forest structure. Potential road impacts to soils, water, wildlife, and other resources would be greatly reduced through the use of helicopter logging. Timber stands that do not lend themselves to uneven-aged prescriptions would not be harvested at this time. Mitigation for and protection of long-term resource values would meet or exceed the Forest Plan standards and guidelines.

Timber - Use harvest prescriptions that create small openings and emphasize uneven-aged management where appropriate. Bring stand growth up to ~50 percent of site potential by harvesting 3.0 million board feet from 555 acres using the following prescriptions: 390 acres of uneven-aged (small group selection cuts) harvest, 102 acres of sanitation salvage harvest (small group and individual tree selection cuts emphasizing the removal of high-risk and dying trees), and 63 acres of shelterwoods.

Use helicopter logging on all 555 acres. Plant seedlings on 78 acres and encourage natural regeneration on 39 acres to bring some stands up to full stocking potential.

Fuels - Treat slash created during logging by jackpot burning 230 acres, by YUM piling and burning 186 acres, and by lop and scatter on 180 acres of harvest treatments.

Roads - Construct no new roads. Reconstruct 6.5 miles of existing road to access helicopter landings and haul out logs. This road work and use would require obtaining a rights-of-way from the current landowners. Following the sale, most roads would remain open to public motorized vehicle access.

Figure 2-4 in Chapter 2 shows the proposed road reconstruction and harvest unit locations for Alternative D.

EFFECTS OF THE ALTERNATIVES ON THE ISSUES

Table S compares the alternatives, in terms of environmental effects on the issues, in a condensed, side-by-side format. See Chapter 1 for background on the issues. See Chapter 2 for a detailed description of the proposed alternatives and mitigation. See Chapter 3 for a complete description of effects by alternative and the scientific basis for the results displayed in the comparison table.

Table 2-2. Comparison of the Alternatives by Issue and Indicator

Issues and Indicators	Alternatives			
WATER	**A**	**B**	**C**	**D**
Percent Over Natural Sedimentation				
Hazard Creek Subwatershed	1.1	1.5	1.3	1.4
Lower Hard Creek Subwatershed	0.3	0.9	0.3	0.7
Percent of Subwatershed Harvested				
Hazard Creek Subwatershed	2.4	7.0	4.1	4.7
Lower Hard Creek Subwatershed	1.0	5.3	2.4	3.1
FISH HABITAT	**A**	**B**	**C**	**D**
Percent Over Natural Sedimentation				
Hazard Creek Subwatershed	1.1	1.5	1.3	1.4
Lower Hard Creek Subwatershed	0.3	0.9	0.3	0.7
Proximity of Harvest to Perennial Waters				
Miles of Harvest Unit Boundary Along Streamside Management Zone	0	6.8	4.6	4.9
	But no harvest within 300 feet of anadromous streams			
Miles of Road Reconstructed	0	6.5	1.2	6.5
Number of Stream Crossings Constructed	0	0	0	0
Risk of Toxic Spills	Low	Low	Low	Low

Table S Continued

BIOLOGICAL DIVERSITY	A	B	C	D
Percent of Old Growth Left In Planning Area After Sale (Forest Plan Goal = 5%)	18	8	16	14
Remaining Unfragmented Forest Blocks Left In Planning Area After Sale	5 in all areas	1 in center	1 in center 2 in south	4 in all areas
Effects on Special Habitats				
Percent of Special Habitat Disturbed:				
Grand fir/Queencup beadlily	0	44	9	19
Grand fir/Western goldthread	0	100	0	0
Effects on TES Plants	none	nearby road and unit	none	nearby road and unit

TIMBER	A	B	C	D
Acres Treated	0	836	205	555
Percent of Acres Treated in Relation to Suited Acres in Need of Treatment	0	39	10	16
Volume Harvested (MMBF)	0	7.1	2.4	3.0
Growth as a Percent of Site Potential	-72	-18	-61	-50
Acres by Cutting Method				
Clearcut	0	0	33	0
Shelterwood	0	734	172	63
Commercial Thin	0	0	0	0
Uneven-aged	0	102	0	492
Acres by Logging Method				
Tractor	0	0	0	0
Skyline	0	0	0	0
Helicopter	0	836	205	555
Acres by Reforestation Method				
Acres Planted	0	0	33	78
Acres Natural Regeneration	0	0	0	39

WILDLIFE HABITAT	A	B	C	D
Loss on Wildlife Biological Diversity				
Planning Area:	slight risk	slight risk	no risk	no risk
Watershed Area:	slight risk	no risk	no risk	no risk
Effects on Special Wildlife Habitats	little or no change	decrease old growth, improve shrubs	little or no change	slight decrease in old growth, improve shrubs
Effects on Elk Habitat				
EHE Rating 2 Years After Harvest (Forest Plan Goal = 90)	97	89	97	97

Table S Continued

WILDLIFE HABITAT	A	B	C	D
Effects on Pileated Woodpecker Habitat				
Short Term:	none	moderate	slight	slight
Long Term:	none	moderate	slight	moderate
Effects on Williamson' Sapsucker Habitat	none	slight	none	slight
Effects on Vesper Sparrow Habitat	none	none	none	none
Effects on Threatened and Endangered Species Habitat				
Peregrine Falcon:	none	slight risk of disturbance	slight risk of disturbance	slight risk of disturbance
Gray Wolf:	none	slight improvement	slight improvement	slight improvement
Effects on Sensitive Species Habitat				
Old Growth Species Habitat:	none	moderately reduce	slightly reduce	slightly reduce
Effects on Sensitive Species Viability	none	slight risk for Goshawk	none	none

RECREATION RESOURCES	A	B	C	D
Change In RVDs (Percent Change by Year 2000)	30	69	73	93

	A	B	C	D
Change In ROS Acres				
Roaded Modified Acres	550	550	650	550
Undeveloped Semi-primitive Acres	3550	2714	3345	2995
Developed Semi-primitive Acres	0	836	205	555
Acres Visually Affected	0	836	205	555
Acres Not Meeting VQOs	0	0	0	0
Miles of Trail Corridor Affected	0	0.75	0	0.75

ROADLESS CHARACTER AND WILDERNESS POTENTIAL

	A	B	C	D
Acres In Roadless Area Eligible For Future Wilderness Consideration	3,350	1,050	2,830	1,450
Effects on Wilderness Attributes				
Acres Lost Long-Term:	0	2,300	520	1,900

Table S Continued

ECONOMIC, SOCIO-ECONOMIC, AND SOCIAL

	A	B	C	D
Present Net Value (Dollars)				
For All Resources:	266,000	798,000	393,600	343,900
For Timber Only:	0	532,200	126,700	79,600
Timber-Linked Jobs	0	7.1	2.5	3.1
Timber-Linked Income (Dollars)	0	313,000	105,800	132,300
Payments to Counties (Dollars)	0	136,400	48,600	58,700
Social Conflict	One timber sale alone would not cause social effects. Only a combination of current and future timber sales—along with other major activities such as recreational and residential developments—would result in discernible cumulative effects on social groups. See Social Effects section, Chapter 3.			

ROADS AND ACCESS	A	B	C	D
Miles of Road Reconstruction	0	6.5	1.2	6.5
Miles of Open Road During Sale	4.0	8.8	4.9	8.8
Miles of Open Road After Sale	4.0	8.8	4.9	8.8

IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Alternative B is the preferred alternative for the Hazard Helicopter timber sale. This alternative is described in detail on pages 2-4 to 2-5 of Chapter 2 of this EIS and also includes the management requirements and mitigation measures listed on pages 2-11 to 2-15.

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